THE HAZARD OF THE HOUSEHOLD MICROENTERPRISE: A CASE STUDY FROM GUYANA, SOUTH AMERICA

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Each day, new businesses enter the marketplace while others fail and exit. These enterprises operate under the management of an entrepreneur and combine human, physical and financial capital with labor to produce goods and services for a diverse set of consumers. Survival of these enterprises is a function of effective deployment of these resources, relative to other competing enterprises. The entrepreneur--at the center of such enterprises--additionally brings a unique set of traits to the enterprise.

In this research, Singh et al. (1986) provides a point of departure for the development of a theory of household microenterprise (HME) formation. HMEs arise in response to expected rents to household entrepreneurial capacity (Friedman 1976). HME hazard--the conditional probability of failure--is assessed according to a set a independent

variables, namely: owner age, prior experience, gender, education and geographic location. The role of finance in HME survival is given added attention via a case study of the Institute for Private Enterprise Development (IPED), a small-scale credit program in Guyana, and the inclusion of specific financial variables (e.g., liquidity, savings) in the empirical analysis.

Nonparametric hazard rates are estimated 680 HMEs in Guyana, South America and comparisons are drawn for subsets of (1) agricultural HMEs, (2) female- and male-owned HMEs and (3) internally capitalized HMEs. Nonparametric estimation with covariates--following the proportional hazards model (Cox 1972, Kiefer 1988)--is conducted on the aggregate sample (under the assumption of a common, unspecified baseline hazard) and on female- and male-owned HMEs (under the assumption of distinct baseline hazards by gender). Owner age and prior business experience, both proxies for managerial efficiency, are associated with lower hazard rates. Finance impacts HME hazard at the time of enterprise formation; HMEs which use internal sources of start-up capital (e.g., personal savings, family funds) face higher hazard rates than those firms which access external start-up capital (e.g., banks, lending agencies). Furthermore, data reveal that only six percent of sampled HMEs had access to external credit.

CHAPTER 1
INTRODUCTION

Overview

Each day, new businesses enter the marketplace while other businesses fail and exit. These enterprises operate under the management of an entrepreneur who combines human, physical and financial capital with labor to produce goods and services for a diverse set of consumers. Survival of these enterprises is therefore a function of effective deployment of these resources, relative to other competing enterprises.

The entrepreneur--at the center of such enterprises--brings a unique set of traits to the enterprise. Furthermore, the environment in which the entrepreneur operates carries its unique set of characteristics as well. Thus, forces *internal* and *external* to the enterprise impact its ability to survive and thrive.

This research investigates these internal and external forces and relates them to survival of the household microenterprise (HME). It does so by first reviewing the literature on entrepreneurship, the small firm and enterprise survival. Additionally, the pivotal role of one external force--finance and financial intermediation-- is explored in the literature and through a case study of one particular development financial institution. Next, it extends microeconomic theory to include a theory of the household microenterprise. Then, it introduces an empirical model of firm survival, supported by

existing literature, and applies it to a unique data set of HMEs located in Guyana, South America.

Small-scale production and service enterprises can be widely observed in developing countries. The *microenterprise*--the smallest of these enterprises--typically has a total labor force of ten or fewer; in many instances, a single individual--the *microentrepreneur*--controls and singularly operates the business. Where additional laborers are required in the enterprise, the household often serves as a ready pool of employment for the microenterprise. Not only labor but also physical and financial resources appear to flow freely from the microenterprise to the household and vice versa as needed in an effort to maximize household utility and enterprise revenue. The microenterprise is a primary means of survival for these households; therefore, survival of the enterprise has a direct impact on the health and well-being of those who derive their sustenance from it. Thus, these intuitive linkages between the household and the HME indicate the need to broaden existing household production theory to encompass entrepreneurship.

The dictionary defines *survival* as "endurance, maintenance, or living" and its converse, *hazard*, as "a danger, a peril or a risk" (Stein 1971). Survival and hazard also have precise statistical meanings. Simply put, hazard is the probability of dying or failing in the next time period ($t+\Delta t$), conditioned on having lived or existed up to the present (t). The hazard observed may be that of an individual, an object, or some other entity, e.g., a business. Our concern is with a span of time, beginning at the "birth" of the individual or object, and ending at its "death." As might be expected, the concepts

of survival and hazard have most often been used in medical research to investigate linkages between patient mortality and their respective treatment programs. The engineering sciences also use survival and hazard in assessing the failure of machine parts and devices under specific types of stress. In economics, the analysis of duration data has been most prominent in the area of unemployment (e.g., Kennan 1985).[1] More recently, economists have used duration data to explore survival of firms and those variables which explain it (e.g., Behrman and Deolalikar 1989, Audretsch 1991, Mata and Portugal 1994, Audretsch and Mahmood 1995, McPherson 1995).

A variety of techniques, each with distinct information requirements, can be applied to the analysis of firm-level duration data. *Nonparametric* techniques, such as those pioneered by Kaplan and Meier (1958), make use of cross-sectional firm-level data on entry and exit times to construct hazard and survival rates. Where economic theory supports it, a parametric distribution (e.g., exponential, Weibull, log-normal) can be applied to the data to obtain hazard and survival rates. Finally, specific entrepreneurial and firm characteristics can be incorporated into a regression-like setting as a means of studying the impact of both external and internal forces on the survival of the enterprise.

In this research, I apply a proportional hazards model as introduced by Cox (1972) to an analysis of household microenterprise survival in Guyana. The proportional hazards model is given as: $\lambda_i = \exp(z)\ \lambda_0$, where the baseline hazard (λ_0) is related to each firm's individual hazard (λ_i) through the scalar effect of a set of explanatory

[1] *Duration data* refers to all data related to the span of some event, e.g. spell of unemployment or life span of a firm. *Survival data* is also used interchangeably.

variables or *covariates* (z). The model is nonparametric in that the baseline hazard remains unspecified (Kalbfleisch and Prentice 1980, Kiefer 1988). Data for estimation of the model were obtained from 680 Guyanese HMEs, of which 542 were existing HMEs and 138 were terminated HMEs. These data were representative of the scale and scope of small industry in Guyana at the time of the fieldwork. They include agricultural, manufacturing, services and retail establishments in both rural and urban settings.

A key external force on the HME--financial access--is vital to its survival. Let it be clear at the onset that finance in and of itself is not a meaningful point of debate for the development theorist or practitioner. Much like any other resource, finance is scarce. Extended fungibility describes the household's ability to reallocate existing resources among market and household production and confirms that the household is uniquely poised to exploit emerging market opportunities by quickly reorganizing its production mix. However, HMEs face a binding liquidity constraint which can best be relaxed through external financial resources. Finance may be a binding constraint that discourages rather than stimulates enterprise survival and growth. "Finance is a binding constraint when all other ingredients for successful investment are present except finance," and when finance is sufficient to activate these other ingredients. (Von Pischke 1991, p. 83). It is therefore imperative that increased attention be given on the part of financial intermediaries—both formal and informal—to the provision of financial services to the small business sector.

There exist two contrasting paradigms in the ongoing discussion of effective access to financial markets by microenterprises. The first paradigm contends that market

failure prevents the allocation of financial services--chief among them, credit--to lower income households and relatively smaller firms. Since administrative costs tend to be invariant to loan size, the formal financial sector maximizes its revenues by targeting large-scale borrowers. Furthermore, such borrowers often are established and well-known to these financial institutions. By comparison, the microentrepreneur represents an unknown quantity to the formal financial sector. She typically has no securable assets to support a loan application; thus, the common recourse available is to secure finance from informal sources, such as family, friends or the traditional moneylender.

That the market ostensibly fails under these conditions begs the question of how one can and should intervene to correct it. If poor households and microenterprises are marginalized from financial market participation, alternative institutions must be developed to meet their needs for credit and other financial services. In accordance with the market failure paradigm, governments of developing countries--with the substantial financial assistance from multi- and bilateral institutions--have undertaken various farm credit initiatives and small business credit programs, all of which were designed to correct the perceived market failure. In Guyana for example, government-owned GAIBANK (Guyana Agricultural and Industry Bank) met the credit needs of small farmers and, to a lesser extent, small-scale industry; however, it was prohibited from mobilizing savings. Non-governmental organizations (e.g., Acción International) have also been active in designing credit programs for small-scale business. In fact, institutions which have emerged around the market failure paradigm have tended to emphasize credit services while paying scant attention to the importance of savings mobilization (Vogel 1984, Von Pischke 1991).

The second paradigm--efficient financial markets--focuses on the long-term viability of financial institutions while dispelling the concept of some unmet credit need on the part of the microenterprise. Financial contracts create value by leveraging mutual confidence to minimize risk (Von Pischke 1991). Where confidence is absent, financial intermediation will not occur because there is no common ground of trust between the parties of the contract. In this case, credit need on the part of the borrower is immaterial; a means of building confidence is required before effective financial intermediation can occur. Credit then becomes the privilege of those individuals able to construct a relationship of confidence with the financial intermediary. The implication here is that applications for credit can be rejected where the risk to the lender is greater than his willingness to bear it.

Both of these paradigms merit consideration but neither can be used exclusively as a yardstick by which to guide financial market development. Anecdotal evidence abounds regarding the inability of the smallest businesses in developing countries to access and successfully obtain needed finance. Simultaneously, an assortment of credit institutions have performed poorly, with some failing altogether, while attempting to target credit to the "poorest of the poor." Adams et al. (1984) and Adams and Von Pischke (1992) have been instrumental in bringing the pitfalls of subsidized and directed credit programs to the forefront, particularly in the agricultural sector. They have furthermore attributed the microenterprise "movement" and its associated assistance programs as a sort of *deja vu*; it appears to follow closely the models of agricultural assistance during the 1970s in the developing world. How can sustainable financial

institutions meet the effective demand for financial services among the poorest sectors of the economy? Can innovative methods of confidence-building and risk-minimizing extend the outreach of existing financial institutions? Or, does the situation imply an opportunity for entrepreneurship within the financial sector such that new institutions arise to fill this market niche?

The obvious question here is "so what?" Is it really important that financial intermediation has not deepened to the level of the household microenterprise or the poorer segment of the population? If the experience of other countries is any guide, lifting the financial constraints on households and small businesses can be instrumental in unleashing significant economic activity.[2] For example, Grameen Bank focused its credit and savings operations on the landless women entrepreneurs of Bangladesh (Hossain 1988, Khandker et al. 1995). These women could not qualify for credit under standard terms requiring security or collateral. However, by cross-guaranteeing loans through the *solidarity group* concept, credit has become a reality for these women. Grameen bank has become a model case of innovation in financial intermediation that truly cuts to the heart of economic development and improvements in well-being. The question is not so much whether the poor should have access to credit, but rather how and under what circumstances can the poor qualify for credit services in a way that is both fiscally sound and financially viable for the intermediary institutions.

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[2] The links between financial intermediation and economic growth are investigated by King and Levine (1993a, 1993b). They find a positive association between financial intermediation and economic growth.

Problem Statement

There exists no economic theory that combines elements of household production and market production, as we observe in the household microenterprise. Becker (1965) shows how the household allocates resources in *Z-goods* production; wage labor affords the household access to market goods, which in turn supply the household with a flow of services. However, Becker's model does not address the household that takes part in both Z-goods and market production. Our theory of the firm tends toward static analysis and away from the dynamics which characterize entrepreneurship. Economic history teaches us that small firms have been a vital force in the economic development of the present-day industrialized countries.[3] A stronger theoretical treatment of the household microenterprise can provide insights into how household firm formation occurs and the manner in which it survives and thrives.

At the most basic level, data on microenterprise activity are scarce. Economic research devoted to the microenterprise is scarcer still. Where data are available they tend to emanate from those institutions which offer financial services to the microenterprise sector. As such, these data suffer from selection bias in that only those enterprises accessing these services are included in the data set. No information is obtained on enterprises that either fail to qualify for these financial services, do not require external finance due to sufficient internal liquidity, or are unaware that such services exist.

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[3] Major exceptions are the former Soviet-bloc industrialized countries.

Additionally, success and failure, survival and hazard, are only meaningful concepts when examples of both states of nature can be observed; these would include observations on currently operating microenterprises as well as terminated or failed microenterprises. In order to craft improved policy for the microenterprise, we must first compile a database which characterizes the sector and then determine which characteristics are significant in the performance of the microenterprise. Few studies to date have taken up the dynamic *survival* of the microenterprise and the variables which help to explain it.[4]

Today, policy makers are waking up to the importance and potential of the microenterprise sector in the developing economies of the world. The microenterprise sector is seen as both an "engine for growth" in new market economies and a mechanism by which massive unemployment and underemployment can be redirected and more effectively exploited. Nevertheless, it is vital that any initiatives which promote and stimulate the proliferation of microenterprises first answer the question, "What internal characteristics of the enterprise impact its probability of survival?" and just as important, "How do forces external to the enterprise impact its probability of survival?" The ability to answer such questions is all the more crucial, since the microentrepreneur is often already surviving "on the margin" without a safety net.

Microenterprise programs have tended toward supply-led initiatives; institutions form in response to the availability of funds to be used for "micro" credit. Such

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[4] Only McPherson (1995) has looked at the hazard of small firms in southern Africa; no such work has been done in Latin America or the Caribbean to my knowledge.

institutions then seek out clients to whom funds can be disbursed. Until recently, the perceived urgency of directing and targeting credit to the microenterprise sector obscured the concomitant importance of the financial sustainability of these institutions. In fact, the initial seed money upon which these institutions were founded tend to be subsidized capital or grants. Structural adjustment and the overall shift of focus toward market strengthening--especially in the financial sector--has sparked renewed interest in assessing the sustainability of alternative financial institutions (Von Pischke 1991, Yaron 1992a and b, Popiel 1994, Gurgand et al. 1994, Otéro and Rhyne 1994).

Research Objectives

Specifically, three objectives are sought in this research, namely:

1. Extend microeconomic theory to include a theory of the household microenterprise.
2. Estimate the hazard of the household microenterprise and those variables which impact it using a sample of Guyanese microenterprises.
3. Explore the linkages between finance and financial intermediation and the survival of the household enterprise, using a case study from a development financial institution in Guyana

Chapter 2 reviews the relevant literature, focusing on the entrepreneur, the small, firm and enterprise survival. Chapter 3 highlights the role which finance plays in the survival of the HME; it reviews the financial literature and chronicles the experience of the Institute for Private Enterprise Development in delivering financial services to the microenterprise sector of Guyana. Chapter 4 proposes a theory of the microenterprise

and its survival. Chapter 5 presents empirical approaches--both nonparametric and parametric--useful in the analysis of duration data. Chapter 6 provides an overview of the data collection process and a descriptive presentation of the data set. Chapter 7 presents the results of nonparametric and parametric estimation detailed earlier in Chapter 5. Finally, Chapter 8 offers of a summary of the research conducted, conclusions drawn and recommendations for further research.

CHAPTER 2
THE ENTREPRENEUR, THE SMALL FIRM AND THEIR SURVIVAL: A REVIEW OF THE LITERATURE

In this chapter, I present a review of the entrepreneur and his or her role in enterprise creation and evolution. Next, I survey the literature related to the small and microenterprise and relate it to the entrepreneur. Finally, I discuss various empirical studies which deal with the determination of enterprise success and failure as well as the internal and external forces which impact it.

The Entrepreneur

The principal player in the success of an enterprise is the entrepreneur. The entrepreneur initiates production by identifying opportunities, marshaling resources, applying managerial expertise, utilizing asymmetric information, ultimately amassing profits from his innovative action. The success of a free-market-based development depends on the success of private business, which itself is a function of the skills of private entrepreneurs (Leibenstein 1968, Taslim 1995). Therefore, attention to the quantity and quality of the entrepreneurial class is necessary for sustained private sector development, especially in countries like Guyana where the private economy is still in its early stages.

Most of the twentieth century has witnessed a "virtual disappearance of the entrepreneur" from the economic literature (Baumol 1968, 1993a and b). An emphasis on optimization, under a set of simplifying assumptions, has provided much insight into the

profit-maximizing behavior of the enterprise. Yet the almost universal domination of such mathematical tools and the constraints they require have effectively "squeezed out" the entrepreneur from the body of accepted economic theory. The innovative and discontinuous actions of the entrepreneur, combined with the uncertain or unknown operating environment, are difficult to translate into the mathematical language of today's economics. Nonetheless, as Casson (1982, p. 10) asserts, "The need for a theory of entrepreneurship is most apparent when analyzing the reasons for success and failure of the firm."

Contributions to entrepreneurship research have emerged from the fields of agriculture, anthropology, economics, education, finance, history, marketing, mass communications, political science, psychology, sociology, and strategic management across at least 31 academic journals (Low and Macmillan 1988). The almost universal deference to the neoclassical paradigm and its assumptions--both explicit and implicit--at best mitigates and at worst completely eliminates any role for the entrepreneur. Emphasis is on optimal choice under the proviso of perfect information, in which case decision-making takes on a mechanistic veneer.

Despite its use for over two centuries, scholars continue to wrestle over a working definition of entrepreneurship (Bygrave 1989). While many definitions for the entrepreneur are available, most tend to be complementary rather than competitive in that they focus on different characteristics of the entrepreneur (Baumol 1993a). Entrepreneurship is itself a "web of contiguous and overlapping constructs, such as (1) management of change, (2) innovation, (3) technological and environmental turbulence, (4) individualism and (5) industrial evolution" (Low and Macmillan 1988).

Cantillon (1755) is credited with the first use of the term *entrepreneur*. Risk and uncertainty are at the core of his concept of the entrepreneur. Cantillon's entrepreneur is chiefly one of commerce or trade who "buys at certain prices and sells at uncertain prices." Cantillon emphasizes the incomplete information with which the entrepreneur engages in business. He also removes the proprietors of land from the possible group of entrepreneurs and divides all others among two classes--entrepreneurs and hired people. *Entrepreneurs* operate in an uncertain environment and work for unfixed wages, while *hired people* earn a fixed wage. Among the entrepreneurial class, Cantillon even includes beggars and robbers (Cantillon 1755)

Knight (1921) continues the theme of uncertainty with respect to the entrepreneur and uses the assumption of perfect information in an illusion to the inadequacies of the neoclassical paradigm in effectively treating the entrepreneur. Under perfect knowledge, actions take on a mechanical dimension; mere execution of the production process is of primary concern. When uncertainty is present, these actions become secondary to the questions of *what to do* and *how to accomplish it;* these questions are answered by the entrepreneur. In short, uncertainty implies decision-making and decisions imply the entrepreneur.

The entrepreneur has both responsibility for and control over the production process. Similar to Cantillon's dichotomy, Knight identifies two distinct forms of income. The first--*contractual income*--is that which is paid to the factor of production, e.g., labor. This is typically the income of the wage laborer (or hired person *a la* Cantillon) and paid out by the entrepreneur. The second type of income--*residual income* or profit--is that

which remains after the sale of production. The residual income signals potential market entrants and is therefore indicative of a continuum moving from monopoly toward perfect competition. Opportunity for entrepreneurship remains as long as profits are positive in the industry.

Friedman (1976) echoes Knight's twofold concept of income within a treatment of entrepreneurial capacity. An individual who owns resources can derive income from them in only two ways: (1) by contracting them to other individuals for a fixed sum (i.e., rent) or (2) by deploying them on her own, perhaps in conjunction with other resources she may hire. The latter case is deemed *residual income* by Friedman; the residual income recipient--together with the resources she deploys (whether owned or hired)--constitute *a firm*.

Next, Friedman notes the observed difference between expected residual income and expected contractual income among firms. Differences in income are due to the types of resources owned by the firm. The first type--hired resources--are those physical resources contracted from oneself or others and for which there are perfect substitutes. The second type (and most important to our present discussion) is *entrepreneurial capacity*, which is the difference in productivity between hiring a physical resource to others and hiring (or deploying) it to oneself. Entrepreneurial capacity is unique to each individual and as such has no substitute in the market. Furthermore, entrepreneurial capacity is similar to potential energy; it requires an outside force to activate it, converting

it into kinetic energy. As Friedman notes,

> "For some sets of prices [entrepreneurial capacity] will be supplied in its entirety; for other sets of prices, not at all. For this kind of fact, then, *given conditions of supply* means a statement of the economic characteristics of the firms--or of the 'entrepreneurial capacities' of the founders of the firms--that would be formed under all possible sets of prices." (Friedman 1976, p. 105).

Friedman's entrepreneurial capacity allows the specification of two types of firms. In the first case, the firm possesses ample hired resources, yet lacks sufficient entrepreneurial capacity to deploy these resources productively. In the second case, the residual income recipient possesses sufficient entrepreneurial capacity, yet is limited by the accessibility of adequate hired resources to carry out production. In the latter case, the "resource-constrained" entrepreneur must seek out finance to obtain the required additional hired resources. In this way, entrepreneurial capacity helps to explain the observed size distribution of firms.

In his treatise titled "The Nature of the Firm," Coase (1937) identifies the coordinating function of the entrepreneur. There is a cost to discovering the price and quantity relationships in the marketplace. The entrepreneur, in organizing and directing the acquisition and allocation of resources, lowers marketing costs. Coase supports Knight's proposition that entrepreneurs exploit an uncertain environment in their decision to undertake production. He also suggests a relationship between firm size and the marginal benefit of internalizing market transactions within the firm. "Other things being

equal, a firm will tend to be larger (1) the less the costs of organizing and the slower these costs rise with an increase in the transactions organized, (2) the less likely the entrepreneur is to make mistakes and the smaller the increase in mistakes with an increase in the transactions organized, and (3) the greater the lowering (or the less the rise) in the supply price of factors of production to firms of larger size" (Coase 1937, p. 45). Hence, transactions costs can limit the size of the firm.

Under Schumpeter, it is the producer, not the consumer, who initiates economic change. Schumpeter links the entrepreneur to *innovative behavior* and lists five ways in which innovation occurs, namely: (1) the introduction of a new good, (2) the introduction of a new method of production, (3) the opening of a new market, (4) the conquest of a new source of raw materials, and (5) the carrying out of the new organization of any industry. He focuses on discontinuity in the circular flow--the so-called "creative destruction"--whereby stagecoaches yield to railways and that which was *en vogue* becomes *passé* (Schumpeter 1911). Schumpeter acknowledges the necessity of savings and its relationship to investment, but argues that domestic resource mobilization does not alone imply economic development. It is rather the employing of existing resources in a different way and doing new things with them that typifies economic progress. Mobilization plus innovation yields more effective resource allocation.

Schumpeter draws a clear boundary between the capitalist and the entrepreneur. Finance is essential for any business venture; the capitalist supplies the capital for the venture and bears the risk--financial and business--associated with the innovation. In Schumpeter's estimation, the entrepreneur's sole function is that of innovator; he bears no

risk since he has no financial stake in the venture. As we shall discuss later, this clear distinction between capitalist and entrepreneur appears to break down in the case of the household microenterprise.

We can truly find a home for the entrepreneur within the writings of the Austrian economists, specifically those of Israel Kirzner. Kirzner (1973) asserts that a market consisting exclusively of economizing, maximizing individuals does not generate the true market *process* that we seek to understand. The market process is itself a two-fold phenomenon, combining the characteristics of *homo economus* ("economic man") and *homo agens* ("enterprising man"). Maximization presupposes knowledge regarding the underlying means-ends framework to which the economic agent is subject; this is itself a product of perfect information. Kirzner asserts that before maximization can take place, the economic agent (*homo agens)* must first identify and choose among the myriad ends and scarce means which compose the opportunity set. Thus, *homo economus* and *homo agens* combine in what the Austrians term *human action*. This shifts the analytical focus away from the equilibrium price and quantity and toward the entrepreneur's ability to operate in a world of incomplete information.

Furthermore, entrepreneurship, in Kirzner's estimation, permits the market to be viewed in the context of monopoly, rather than perfect competition. The entrepreneur possesses asymmetric information which is transformed into market power.[1] Use of such information leads to the accumulation of *pure entrepreneurial profit*; it accrues to the

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[1] Asymmetric information indicates that one agent (in this case, the entrepreneur) possesses more information relative to the other agent(s) in the market. Incomplete information does not necessarily imply asymmetric information.

entrepreneur at no cost. As such, Kirzner's entrepreneur can be classified as an arbitrageur. This should not be confused with the risk-return element of investment; pure entrepreneurial profit can be had for nothing at all. The entrepreneur hopes to profit from the difference in perception by "taking a position" *vis-á-vis* other people; he sees opportunity where others do not (Casson 1982, 14). Kirzner follows Schumpeter in separating ownership from entrepreneurship and identifies two roles in the production process: the resource owner and the pure entrepreneur.

Schultz (1975) analyzes entrepreneurship in the context of the capacity to deal with disequilibria. Schultz defines economic progress as the continual reallocation of resources by individuals--whether they be laborers, homemakers or capitalists--as a response to changes in the economic environment. For example, farmers using traditional methods of cultivation are presumed to be at or very near the production possibilities frontier. While the technology they use may be rudimentary, these farmers "know from long experience what their own effort can get out of the land and equipment" (Schultz 1975, p. 47).[2] As modernizing technologies emerge, whether from organized agricultural research or in response to changing market demand, farmers reallocate resources in an effort to get back to equilibrium. Schultz dispels the "zero profit" presumption of general equilibrium theory by contending that expected income gains serve as an incentive to adjust in the face of disequilibrium. He also finds compelling evidence to support the

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[2] This has been termed the "poor but efficient" hypothesis, as discussed in Tax (1953) regarding farmers in Panajachel, Guatemala, and also reinforced by Schultz (1964). See also Hopper (1957) for similar observations.

hypothesis that "the ability to successfully deal with economic disequilibria is enhanced by education" (Schultz 1975, p. 62).

Leibenstein (1968) defines the entrepreneur as one who (1) connects different markets, (2) fills the gaps which arise from market deficiencies, (3) effectively marshalls required inputs to complete production, and (4) creates or expands the firm. The Leibenstein model is bounded by the following assumptions: (1) motivation internal to the firm is a nonmarket input, (2) slack exists due to low input efficiency, (3) enterprise creation requires a critical mass of inputs, and (4) some inputs (e.g. knowledge, managerial ability) are non-exhaustible and perhaps increasing over time. He links entrepreneurship to economic development and asserts that there is a demand in many developing countries for *gap-filling* and *input-completing* activities in the production process. The presence of "slack" or low input efficiency (or what Leibenstein terms *X*-inefficiency) in the production process creates an opportunity for the entrepreneur to narrow the gap between actual production and the production possibilities frontier (Leibenstein 1966). Hence, *X*-inefficiency, combined with the presence of non-marketed inputs (e.g, managerial ability), implies that market signals for profit opportunities may be blurred. Similar to Kirzner, Leibenstein's entrepreneur brings these otherwise blurred opportunities into focus, by "taking up the slack" and completing the production process. One conclusion drawn from his model is the potential increase in the supply of entrepreneurship from entrepreneurial training and education programs.

A model based on Schumpeterian entrepreneurship relating technology, managerial ability and firm size is presented by Calvo and Wellisz (1980). They establish a general

equilibrium model in which technology is exogenous and continually growing. All individuals have access to a common pool of knowledge, but differ in their abilities; only those who acquire sufficient knowledge become entrepreneurs. Calvo and Wellisz demonstrate that the pace of technological progress dictates the size of the entrepreneurial class and therefore the average firm size. Faster technological progress will limit the number of individuals who are able to acquire sufficient knowledge and become entrepreneurs, which in turn will increase the average firm size. Calvo and Wellisz contend that the *age* and *experience* of the entrepreneur matter more in relatively static societies, while inherent ability matters more in societies experiencing rapid technological change.

Casson (1982) suggests a close, albeit intuitive, correlation between the personal qualities of the entrepreneur and the economic success of the firm. He defines the entrepreneur as "one who specializes in taking judgmental decisions about the coordination of scarce resources" (Casson 1982, p. 23). The entrepreneur is driven by the desire to *coordinate* rather than consume these resources and believes that without exercising his superior judgement over the resources, wrong decisions will be made and efficiency sacrificed. Baumol (1993b) distinguishes between the *firm-organizing* and the *innovating* entrepreneur, the former being primarily involved in creating and organizing new firms while the latter develops new products or new production processes.

Shailer (1993) revisits the notion of the linkage between the firm and the entrepreneur in a discussion of organizational boundaries of owner-managed firms. Historically, the firm has been divorced from the individual; hence, the balance sheet and

income statement can be used as analytical tools in evaluating firm performance. Shailer offers a counterproposal: owner-managers appear to discount or ignore organizational boundaries in their disposition of assets and debts between personal consumption and the business. The usefulness of financial statement information is therefore limited in assessing pure business performance. Specifically, measures such as return on assets and return on equity may be inappropriate, in that the presence or absence of personal assets introduce bias in such calculations.

A theory of entrepreneurship is put forth by Bull and Willard (1993). They hypothesize that a new combination, causing discontinuity, will be created, i.e., entrepreneurship will occur, under the conditions of (1) task-related motivation (e.g., some vision or sense of social value embedded in the basic task itself that motivates the initiator to act), (2) expertise (e.g., present know-how plus confidence to be able to obtain know-how needed in the future), (3) expectation of gain for self (e.g., economic and/or psychic benefits) and (4) a supportive environment (e.g., conditions that either provide comfort and support to the new endeavor, or that reduce discomfort from a previous endeavor).

The Small Firm

A body of literature has emerged recently in economics and other social sciences which treats the small firm as a subdiscipline. This focus on small business is prefaced by current moves within the private sector to downsize and streamline operations in order to more effectively meet the competitive pressures of a global marketplace. Also, within domestic economies, binding liquidity constraints may dictate both start-up capitalization

and start-up firm size. The efficiency of capital markets and their ability to relax the liquidity constraint through financial intermediation is therefore relevant for the small firm.

Acs (1992) cites four contributions which small firms (i.e., firms with fewer than 100 employees) make to industrial markets.[3] First, they are a major source of innovative activity and thereby take a primary role in the process of technological change. Second, small firms actually generate much of the "market turbulence," altering the nature of competition within a market and serving as agents of change (see also Loveman and Sengenberger 1991). Third, small firms forge international competition by carving out new niches in the market. Fourth, small firms have in recent years been responsible for a large share of new jobs. Acs (1992) also notes that the efficient markets model breaks down for small firms, specifically in regard to credit markets. Imperfections in credit markets can make liquidity a binding constraint for the small firm, making innovation difficult and thereby hindering growth.

Acs (1992) further cites three major changes in the global economy which have increased the importance of small business, namely (1) increased global competition, (2) increased risk and uncertainty in the marketplace, and (3) intensified product differentiation due to consumer preferences. Small firms practice *flexible specialization*--the converse of mass production--by focusing on a particular business area and varying the production when necessary (Loveman and Sengenberger 1991, Acs 1992). Finally, Acs

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[3] The literature is not consistent in defining *small business*. Therefore, as needed, the term is defined for each author cited. Absolute size is less of an issue; perhaps more important is the relative size of firms and the size distribution of firms in the economy at large and within specific industries (Loveman and Sengenberger 1991).

calls for attention to the welfare implications of increased activity of small firms, questioning whether the heightened presence of small firms reflects the comparative advantage of small *vis-á-vis* large firms, or rather the inability of large firms to effectively respond to increasingly global competition. As Loveman and Sengenberger (1991, p. 3) note, "There has been little concern for whether the shift in employment to small firms is independent of the downsizing of the large firm sector, in which case the shift amounts primarily to a displacement effect." Their findings, based on data from the six largest OECD (Organization for Economic Cooperation and Development) countries, indicate an increase in the share of total employment in small enterprises *at the expense* of large enterprises. The data indicate first a decline, then a resurgence in the employment shares of small enterprises from 1958 to 1985.

How does management of the small firm differ from that of the large firm? Welsh and White (1981) contend that, while big business approximates equilibrium (i.e., its cash flow is roughly equal to net profit plus depreciation and amortization), small business incurs significant short-term cash flow fluctuations as well as seasonal variations in sales and revenues. The small firm is also more concerned with liquidity and subsequent cash flow than with profit, since liquidity dictates whether the firm lives or dies.

The long-term viability of small firms may be predicated on what have been termed *internal* and *external* components (Plaschka and Welsch 1990). Internal components include individual characteristics of the entrepreneur, geographic location of the business, financial resources, and various business characteristics, e.g., production methods, marketing, and quality and quantity of labor. External components include the regulatory

regime within which the firm operates, articulation with labor and capital markets, and the institutional support to which the firm may have access. The combined favorability of the set of internal and external components thus shapes the opportunities available to the firm and influence its survival. Since these components vary across countries, it does not seem wise to generalize about a universal positive association between entrepreneurship and economic development (Giamartino 1991).

Given the importance of the small firm in the present-day economy, we now turn to a discussion of the *microenterprise*. While the microenterprise--from its name--is smaller than the small enterprise, it also possesses other distinguishing characteristics in terms of start-up and continued operation which merit attention. Sharma et al. (1990) define the microenterprise as an informal economic endeavor, usually based within the family and operated or managed by one or two people; both agricultural and non-agricultural enterprises are included in this definition. Alternatively, Otéro and Rhyne (1994, p. 26) consider microenterprises as "those firms with up to ten employees, ranging from part-time income-generating activities of individuals, through family-operated businesses, to very small enterprises employing hired labor." In their analysis, Otéro and Rhyne further concentrate on urban and non-farm microenterprises, e.g., manufacturing, commerce and transportation.

From 1978 to 1985, the United States Agency for International Development (USAID) investigated the urban microenterprise in its PISCES (Program for Investment in the Small Capital Enterprise Sector) project. Davies et al. (1992) establish a dichotomy of *household enterprise* and *microenterprise* in their study of the small manufacturing

enterprises in Egypt. OECD (1993) reviews donor assistance to the microenterprise in developing countries. Morrison et al. (1994) and Tokman and Klein (1996) conduct detailed studies of the microenterprise sector in seven countries across three continents, with special attention to the impact of the regulatory regime. Gray et al. (1995) investigate enterpreneurship and the microenterprise in the textile, woodworking and metalwork sectors of Kenya.

Emphasis on the microenterprise sector arose from the multiple policy directives of increased attention to poverty alleviation, greater reliance on private initiative, and the diminishing economic hegemony of the public sector in developing countries (Sharma et al. 1990). These policies emerged during the 1980s as countries and international donors began to reorient toward increased market participation. Macroeconomic reforms were implemented which lifted price controls and reduced or eliminated financial repression in an effort to encourage private sector development.

Microenterprises are a subset of the *informal sector* within the economy--those firms which operate on the regulatory margin with respect to taxation and business licensure. Typically run by a single owner-manager and with an average of less than two employees, these firms require minimal start-up capital, usually no more than the equivalent of a few hundred dollars (Farbman 1981). Little hard statistical data is available as to the relative weight of the microenterprise sector in the overall economy, either in terms of labor force participation or Gross Domestic Product. However, anecdotal evidence and casual observation--especially in central cities of developing countries--lead one to conclude that microenterprises are indeed a substantial source of both employment and income in these economies.

The rather significant participation of women in the microenterprise sector of developing countries, their time devoted to household activities (e.g., water, fuelwood) and the knowledge that women's earnings go primarily toward the upkeep of the family, underscore the likelihood of a nexus between the household and the microenterprise (Downing 1990, Bennett and Goldberg 1993). Additionally, non-separability between the household and the small firm impacts the asset structure of the enterprise. The firm draws on household resources (e.g., labor, financial capital) to smooth its production.

In Egypt, Davies et al. (1992) chose to segment small-scale manufacturers into household enterprises and microenterprises as a means of designing better intervention strategies for each sector. Table 2-1 reveals their suggested typology.

Table 2-1: Characteristics of the Egyptian household enterprise and microenterprise

Characteristic	Household Enterprise	Microenterprise
Labor force	Primarily family members; often female	usually wage laborers; usually male
Production technology	simple, easily accessible; little use of machinery or equipment;	more complex; relatively high use of capital equipment;
Income potential	relatively low, but widespread distribution	higher than household enterprise
Target market	low-income consumer	low-income and high income; greater client diversity
Competition and barriers to entry	high competition; low technology base implies low barriers to new firm entry	Capital intensity may imply barrier to new firm entry and less threat to market share

Source: Davies et al. 1992, pp. 384-387.

Tokman and Klein (1996) analyze the microenterprise sector in Chile, Ecuador and Jamaica. Explicit lists or known universes of the microenterprises in these three countries

did not exist; hence, they established typologies to identify microenterprises in each country and gather data from them. Businesses classified as microenterprises (1) employed fewer than ten persons, (2) had been in operation for more than one year, (3) generated greater than one-half of the owner's gross income, (4) consumed at least 24 hours of the owner's time each week, (5) possessed total fixed capital of less than US$ 12,500 and (6) realized monthly sales of less than US$ 5,000.

Theories of Firm Survival

Marshall (1921) asserts that firms are born and, if successful, will grow; however, most firms will deteriorate and fail. Loasby (1982) refers to Marshall in stating that new firms must learn about their business and that this knowledge, along with firm size, changes not only in response to its environment but also in relation to that environment. The firm is constantly searching for "an opportunity to supply a new commodity that will meet a real want or improve the production of an old commodity" (Marshall 1921, p. 297). Loasby (1982) defines this Marshallian search as a Hayekian discovery process. Marshall did not, however, approach the entrepreneurial role from a dynamic context; he rather depicted a series of incremental changes which eventually lead to innovation. This contrasts with the Schumpeterian concept of innovation--a *discontinuous* shock to the production system.

Jovanovic (1982) models firm success and failure under the assumption of incomplete information. Rather than refer explicitly to the entrepreneur, Jovanovic euphemistically imbues "the firm" with entrepreneurial traits. With homogeneous production and a known time-path of demand, firms enter an industry with knowledge

about the distribution of costs across the industry, but without knowledge of each firm's true costs of production. As each firm begins production, it continually updates its information by comparing its actual costs with the known distribution of industry costs. Those firms which are less efficient eventually exit the industry while those which are efficient remain and grow. Over time, both average profits and average firm size increase as the industry matures and the strong and efficient survive and thrive. The model provides a case for *learning-by-doing*, since those firms which innovate and lower their true costs also become more efficient and increase their probability of survival. As a result, one would hypothesize that the probability of firm survival would increase as a function of time.

While Jovanovic' firm faces a single investment decision and a homogeneous production process, Cressy (1992) puts forth a theory of the "opportunistic entrepreneur" who continually evaluates potential investment projects by following a decision rule which maximizes expected returns. Contrary to Jovanovic, where the learning-by-doing is specific to a singular investment project, Cressy allows learning to occur over a breadth of investment opportunities. As each project either succeeds or fails, the entrepreneur learns from these success and failures, thereby updating his information set and subsequently forming improved investment decisions over time. This approach further allows for the acquisition of entrepreneurial talent through the process of trial and error, a component seemingly absent from the Jovanovic model.

Empirical Studies of Entrepreneurial Success and Failure

In this section, a selected review is presented of empirical studies concerning the survival of the firm. The last few decades have shown a resurgence of interest in success and failure of the business firm. Both finance and accounting have suggested instruments by which propensity to fail can be measured (e.g., ratio analysis). More recently, econometric models which relate the unconditional probability of success to a set of independent variables have been estimated. During the mid-1980s, economics adopted a class of models--*duration models* (also known as survival or hazard models)--which have long been used in biometric research. Table 2-2 presents the most recent studies of firm survival, most of which are discussed in detail below.

Johnson (1969) investigated financial ratios and their usefulness in predicting firm failure. These financial ratios include (1) *current ratio* (Current Assets ÷ Current Liabilities), (2) *acid-test ratio* ([Cash+Account Receivable] ÷ Current Liabilities) and (3) *Return on Assets* (Net Income ÷ Total Assets). Johnson argues that financial ratios provide only a current snapshot of firm status; furthermore, ratio analysis, to be effective, requires a standard by which relative performance can be gauged. Ratios are incapable of capturing the dynamics of firm start-up and firm evolution. Ultimately, he concluded that *ex post* financial ratios provide little insight into *ex ante* firm success or failure.

The first study (to my knowledge) which addresses firm survival in a developing country context was conducted by Behrman and Deolalikar (1989). They used a two-limit Tobit maximum likelihood estimation and drew upon annual data for firms with twenty or

more employees taken from the Indonesian Survey of Manufacturing Establishments.[4] In their empirical model, the authors investigated the associations of firm characteristics *at one point in time* and the probability of firm survival *over time*. The average firm in the sample was approximately twelve years old in 1975, with 93 employees. They found that the age of the firm--viewed as a proxy for *learning-by-doing*-- had a positive and significant effect on the duration of firm survival. Such results correspond with Jovanovic (1982). They also found that firms with higher proportions of family workers (relative to non-family workers) or higher proportions of non-production workers (relative to production workers) tend to have shorter survival periods and attributed this to traditional, "nepotistic" business practices as opposed to "market-oriented" practices.

Do entrepreneurs face a liquidity constraint when deciding between self-employment or wage labor? Evans and Jovanovic (1989) answered this question using data from 1,500 white U.S. males who were wage workers in 1976 and either wage workers or self-employed in 1978. They derived a static model of entrepreneurial choice and rejected the strict Schumpeterian separation between the entrepreneur and the capitalist. They found that most individuals in the sample were not liquidity constrained in that they would have sufficient capital to begin a business if they had chosen to do so. However, high ability/ low asset individuals--those most likely to desire a switch to self-employment--were nonetheless constrained due to available liquidity. This liquidity constraint decreases capital flowing into entrepreneurship in two ways: (1) by shunting

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[4] For Indonesia, this denotes medium and large scale enterprises. In contrast, the sample taken in Guyana (discussed in detail in Chapter 6) comprises firms with ten employees *or less*.

some away from entrepreneurship altogether and (2) by limiting initial capitalization by those opting for entrepreneurship. If the lower initial capitalization is below the minimum efficient scale in the industry, the firm could be at greater risk of failure as well.

Similarly, the extent to which liquidity constraints impact entrepreneurial failure was examined by Holtz-Eakin et al. (1994a and b) using 1981 and 1985 U.S. federal income tax returns. The authors speculated that, in the face of binding liquidity constraints, access to personal (i.e., internal) finance would influence the success of any entrepreneurial venture. They identified those individuals who were sole proprietors in 1981, received inheritances in either 1982 or 1983 and then evaluated the influence of this inheritance--which represents an increase in personal assets--on the decision to remain a sole proprietor. Their work followed an earlier study by Blanchflower and Oswald (1990) which investigated the connection between receipt of an inheritance and the propensity to start a business. Age was also used to proxy business experience. Using a multinomial logit model, four decision choices were specified--survive as an entrepreneur, form a partnership, become a wage earner, or retire from the business. *Inheritance* and *liquid assets* were shown to be positively and significantly correlated with the decision to remain as an entrepreneur. These results lend additional support to the importance of internal finance when imperfect capital markets prevail. Liquidity is a binding constraint on the firm.

Evans and Leighton (1989) analyzed entrepreneurship with data drawn primarily from the *National Longitudinal Survey of Young Men*. Approximately 4,000 white men between the ages of 14 and 24 were surveyed annually from 1966 to 1981. The authors

Table 2-2: Empirical Studies of Firm Survival, 1989-Present

Authors	Date	Country	Survival of...	Empirical Model	Regressors or Covariates
Behrman and Deolalikar	1989	Indonesia	Med/ Large Manufacturing Firms	Two-Limit Tobit	Firm Age, Labor Force, Industrial Sector, Capital Structure, Family Participation, Productivity, Technology
Bates	1990	U.S.A.	Small businesses	Logit, Discriminant Analysis	Education, Familial Self-Employment, Management Experience, Owner's Age, Method of Business Acquisition, Year of Start-up
Audretsch	1991	U.S.A.	Manufacturing Firms	Logit	Total Innovation Rate, Small-Firm Innovation Rate, Scale Economies, Capital Intensity, Concentration, Advertising/Sales, Growth Rate, Single-Plant Share
McDade	1993	Ghana	Small-Scale Artisans	Mult. Regression	Age, Gender, Formal Education, Propensity to Innovate, Use of Outside Traders,
Holtz-Eakin et al.	1994a 1994b	U.S.A.	Entrepreneur	Mult. Logit	Inheritance, Age, Marital Status, #Dependents, Liquid Assets, Homeowner, Adjusted Gross Income, Cash Flow, Revenues
Mata and Portugal; Mata, Portugal, and Guimaraes	1994, 1995	Portugal	the Manufacturing Firm	Weibull, Probit, Logit, Proportional Hazards	Start-up Size, Ownership, Firm Growth Rate, Industry Entry, Labor Force, MES, Concentration, Suboptimal Scale
Wagner	1994	Germany	Small Manufacturing Firm	Probit, Logit. Two-Limit Tobit	Start-up Size, Industry Concentration, Industry Capital Intensity, Industry R & D Intensity, Industry Growth.
Audretsch	1995	U.S.A.	Manufacturing firms	Logit	Total Innovation Rate, Small firm Innovation Rate, Mean largest plant size, Firm Size, Industry Growth, Organization Structure
Doms, Dunne, Roberts	1995	U.S.A.	Manufacturing plants	Probit	Age, Size, Productivity, Technology, Capital-Labor Ratio, Industrial Sector.
McPherson	1995	Southern Africa	Small and Microenterprises	Proportional Hazards	Employment Growth Rate, Labor Force, Economic Sector, Geographical location, Gender, access to credit
Audretsch and Mahmood	1995	U.S.A.	Manufacturing firms	Proportional Hazards	Total Innovation Rate, Small Firm Innovation Rate, Establishment Size, Capital Intensity, Ownership, Unemployment Rate, Interest Rate, Growth Rate, Wages, Price-Cost Margin, Price-Cost Margin Concentration

used Probit and nonparametric estimates in making inferences about entrepreneurship from the sample. Several key findings were reported. First, the probability of switching to self-employment was independent of age and work experience. Second, the conditional probability of failure or *hazard* of self-employment decreased as a function of time. Evans and Leighton found that about fifty percent of self-employment entrants returned to wage work within seven years. Third, the proportion of the labor force that was self-employed increased with age until the early 40s then remained constant until the retirement years. Fourth, men with relatively greater assets were more likely to enter self-employment. This aspect of entrepreneurship was also confirmed by Evans and Jovanovic (1989) and indicates that liquidity constraints bind the decision to enter self-employment. Fifth, "misfits" (e.g., poorer wage earners, the unemployed, low-wage workers) were more likely to enter self-employment. Sixth and finally, men with internal locus of control--who believe that their success depends largely on their own actions rather than those of others--were more likely to start a business.

Using both logit and discriminant analysis, Bates (1990) examined the relationship between human capital of U.S. small business owners and business longevity.[5] He attempted to answer the question, "Which entrepreneurs are likely to survive the sorting process that characterizes early years of self-employment?" Among the variables used to measure human capital were (1) years of formal education, (2) managerial experience, and

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[5] Bates classifies "small business" following two sets of criteria. First, the small business filed one of the following U.S. federal tax forms: Schedule C, Form 1065, or Form 1120s. Second, the owner had a financial capital investment greater than zero and annual sales of at least $5,000.

(3) exposure to business within one's family. Logit analysis indicated that years of education was the strongest human capital variable for identifying business survival. Next, Bates took financial capital to be endogenous and hypothesized that the owner's educational and managerial level (i.e., human capital) would impact the ability to obtain business finance. Using regression analysis, he concluded that both human capital and financial capital were strongly linked to business viability. Finally, Bates applied discriminant analysis to the same data set and confirmed the earlier logit results. He also found that reliance on debt capital *vis-á-vis* equity capital did not seem to be associated with either business weakness or an increased risk of failure. Thus, a major key to success is one's capacity to manage the business and make effective decisions.

Audretsch (1991) emphasized the ability to innovate in his analysis of new firm survival. Audretsch used data on over 11,000 firms from over twenty industries for small firms begun in 1976. Analysis of the raw data indicated wide variation in survival rates across industries. Where scale economies and capital intensive industries were present, a firm's ability to learn and adapt were key to its survival. The greater the minimum efficient scale in the industry, the less likely a firm was to survive unless it could adapt, grow and simultaneously deepen its capital base. [6] Audretsch estimated a logit equation of firm survival and included *inter alia* (1) the innovation rate both for the industry and the individual firm), (2) a proxy of minimum efficient scale and (3) the capital-labor ratio, as explanatory variables. His results lend support to the notion that innovative activity on the

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[6] *Minimum efficient scale* is the lower bound of capital stock with which production can take place in an industry.

part of the firm speeds its transition toward the minimum efficient scale and thereby improves its probability of success.

Lentz and Laband (1990) found that the probability that an individual was a self-employed proprietor increased if their parents were also self-employed. This indicates that nurture, as well as nature, may play a role in the propensity to become an entrepreneur and be successful. The choice between self-employment and wage employment is related to managerial ability, according to Blau (1985). He studied this decision in the context of the Malaysian labor market. Here, self-employment was related to entrepreneurship. Blau used data on both self-employed and wage laborers and used age, education, and ethnic origin as proxies for managerial ability. He found a significant, positive relationship between managerial ability and the probability of self-selection into self-employment.

McDade (1993) investigated traditional artisans in Ghana and tested the hypothesis that if a business was successful, its success was associated with certain identifiable entrepreneurial characteristics of the owner. Data were collected from 69 artisans in both rural and urban locations; there was no attempt to locate failed enterprises (which raises concerns for selection bias in any discussion of success). Success was proxied by weekly business revenue and a model was specified which related success to a variety of "business characteristics" (e.g., number of employees, start-up capital, use of outside traders, propensity to innovate) and "personal characteristics" (e.g., age, education, prior artisan training, apprenticeship). McDade found that "business characteristics"--namely, start-up capital, use of traders, and propensity to innovate--were significantly correlated with business success, while "personal characteristics" showed no significant association with business success.

Mata and Portugal (1994) and Mata et al. (1995) studied firm survival in the Portuguese manufacturing sector. Mata and Portugal examined firm survival from 1983 to 1988; Mata et al. extended the period of analysis to 1990. Their data revealed that 20 percent of new firms died during the first year and only 50 percent survived for four years. Mata and Portugal (1994) estimated a non-parametric proportional hazards model and compared these results with (1) proportional hazards model imposing a Weibull parametric distribution, (2) ordered probit and (3) ordered logit.[7] In all estimation techniques used, similar results were obtained, namely: (1) the conditional probability of failure decreased as a function of time, (2) firm survival was greater in fast growing industries and in industries with low entry, and (3) scale economies and minimum efficient scale did not appear to impact firm duration. [8]

Mata et al. (1995) distinguished between *de novo* firms (newly created firms) and *experienced* firms (those which already exist). *De novo* firms were further segmented according to *single-plant* and *multi-plant* units, while *experienced* firms were segmented into *expanding* (if they are increasing activity within an industry) and *diversifying* (if they are moving into a new industry). Empirical survival rates were calculated and *single-plant de novo* entrants were shown to have the highest survival rates, relative to other types of entry. The authors then estimated a proportional hazards model, utilizing three

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[7] The proportional hazards model is explained in detail in Chapter 4. At this point, however, the reader should note that the proportional hazards model estimates the probability of failure *conditional* on having survived up to the present, whereas probit and logit models estimate the *unconditional* probability of failure (see Greene 1993)

[8] Mata and Portugal (1994) defined *minimum efficient scale* as the logarithm of one-half of the average size of the firms in the sample. Firm size was measured by the number of plants each firm operates.

explanatory variables (covariates). *Plant level* variables included plant size and type of entry. *Industry level* variables were entry rate, growth rate, and an interaction term combining these two effects. Finally, the *macroeconomic environment* was measured through the use of time dummies.

Mata et al. found that start-up size was negatively and significantly correlated with the probability of survival for all types of entry. *De novo single-plant* entries exhibited lower failure rates, relative to other entry types. Also, industry growth rate impacted *de novo* entrants more than other entrants, presumably because the growth was predicated on learning about the industry, reducing costs, and improving efficiency (Jovanovic 1982).

In an update to Audretsch (1991), Audretsch and Mahmood (1995) adopted a proportional hazard model to reinvestigate the relationship of new firm survival and innovation. The authors found a significant and negative association between firm hazard and the firm's innovation rate. Start-up size, minimum efficient scale and the innovation rate together impacted the firm's ability to survive.[9] Smaller firms with low initial start-up levels were more prone to failure in either highly innovative industries or in those industries which exhibited relatively high minimum efficient scale. As the firm closed the gap between its actual scale and the minimum efficient scale, it also decreased its hazard rate. This scenario also supports Jovanovic (1982) in that innovation is an outgrowth of learning-by-doing. Only through experience in the industry can entrepreneurs determine if their abilities are sufficient to effectively compete in production. If they can learn, adapt and innovate, they improve their chances of survival.

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[9] Similar to Mata and Portugal (1994), Audretsch and Mahmood (1995) measure minimum efficient scale as the mean size of the largest plants accounting for one-half of the industry value-of-shipments.

Finally, McPherson (1995) studied the survival of the small firm in Southern Africa. McPherson used survey data on both existing and closed enterprises (21,800 total) from Botswana, Malawi, Swaziland, and Zimbabwe. Like Audretsch and Mahmood (1995), McPherson adopted a proportional hazard model estimated by partial likelihood technique. He found a significant inverse relationship between firm growth and the conditional probability of failure. Firm size--as measured by number of workers--had no systematic impact on firm failure, perhaps due to diseconomies of scale or the greater efficiency of small firms compared to their larger counterparts.

In all countries, service businesses were less likely to fail relative to retail firms and home-based businesses were less likely to survive relative to businesses located in commercial districts. McPherson surmised that as physical distance between supply and demand points increased, the probability of closure also increased. Urban enterprises were more likely to survive than rural-based businesses, perhaps due to the higher disposal incomes accessible in urban markets. In two countries--Malawi and Zimbabwe--businesses led by women were more prone to failure, while in Swaziland and Botswana gender had no systematic effect on probability of closure. McPherson suggested that women may be more risk-averse than men but encountered discrimination which men otherwise did not; the net effect of these countervailing forces ultimately determine the impact of gender on the probability of business closure.

McPherson included a variable to capture access to credit by the small firms in his sample. In two countries--Botswana, Swaziland--access to *informal credit sources* actually increased the conditional probability of failure for small firms when compared to

firms that had never received any form of credit. He contended that turning to informal sources (e.g., family and friends) for finance may be the sign of a desperate enterprise. In Malawi, access to informal credit decreased the conditional probability of enterprise failure. These results indicate no clear picture as to the impact financial access may have on firm survival, although the effect does appear to vary across countries.

Summary

Enterprise creation, evolution and survival are all a function of the capacity of the entrepreneur. Microenterprises tap the resources of entrepreneurs but also make use of household resources such that the household and the enterprise unite in a kind of joint partnership. No theory has yet been advanced which draws together both household production and entrepreneurship in an attempt to explain how and why the microenterprise emerges. Chapter 4 sets forth such an attempt.

CHAPTER 3
FINANCE AND THE HOUSEHOLD MICROENTERPRISE

Introduction

Financial access is vital to the household microenterprise, both at its inception and in its continued operation. While HMEs can and often do take advantage of the financial capital available from family members and friends, they nonetheless continually operate under significant liquidity constraints. Formal financial institutions, e.g., commercial banks, are often unwilling to supply finance to HMEs, due to (1) high transactions costs, relative to other clientele, (2) limited information concerning creditworthiness of the HME (i.e., adverse selection), and (3) skepticism of the prospective borrower's ability to meet repayment obligations (i.e., moral hazard). Informal financial institutions can thus bridge the "liquidity gap" faced by HMEs. Examples of such institutions include Grameen Bank in Bangladesh, Unit *Desa* of Bank Rakyat Indonesia, Asocación para el Desarrollo de la Microempresa, Inc. (ADEMI) in the Dominican Republic and others.

Many practitioners of microenterprise finance propose a financial systems approach to the creation and continued operation of such institutions (Von Pischke 1991, Rhyne and Otéro 1994, Schmidt and Zeitinger 1994, Fry 1995). A financial systems approach recognizes that the demand for financial services is not currently met by commercial banks and other formal financial institutions; as such, financially sound

informal institutions can and should be organized to "fill the gap" in financial intermediation. By adopting a financial systems approach to financial intermediation, the center of attention shifts from microenterprise assistance per se toward fostering effective financial depth in the macroeconomy. As financial institutions emerge to serve the substantial client base marginalized from formal financial markets, overall intermediation is improved.

Past efforts to address the financial demands of small-scale producers almost universally followed a strategy of targeted or directed credit (Donovan 1996). Critics of such programs argued that, *inter alia*, the emphasis on credit ignored savings mobilization and that the low interest rates charged actually led to more distortions (e.g., discretionary allocation of credit). Perhaps the single most important criticism of the directed credit programs is the all-too-often absence of financial sustainability. Programs were often unable to generate sufficient net revenues from the lending portfolio to cover capital and overhead costs and otherwise maintain long-term viability (Donovan 1996).

Outreach and self-sufficiency are two fundamental tenets of the financial systems approach. *Outreach* denotes the breadth of the financial institution's client base and can be measured by analyzing the overall loan portfolio. For example, the Bank of Agriculture and Agricultural Cooperatives (BAAC) in Thailand claims two-thirds of rural households as customers (Donovan 1996). *Self-sufficiency* reflects a financial institution's capacity for sustained long-term operations using internal capital rather than subsidized funds or grants. In the past, the objective of poverty alleviation overshadowed the need for development institutions to be fiscally viable; as long as they were viewed as effective in

reaching their intended clientele, grants and subsidies tended to flow in their direction. Today, as a matter of policy, foreign assistance programs are decreasing or eliminating subsidies such as grants and "soft" loans, preferring to offer support in the form of technical assistance.

This chapter reviews the role of financial markets and financial intermediation in the survival of the household microenterprise. In addition to a compact discussion of theoretical and empirical studies concerning financial markets, the chapter also briefly investigates the experience of the Institute for Private Enterprise Development (IPED) and its program of small and microenterprise credit in Guyana. IPED seeks to bridge the gap that exists in access to credit for small-scale enterprises. The analysis will show that IPED has been somewhat successful in its efforts, both in terms of outreach and sustainability.

Financial Access for the HME

Theory informs us that, in equilibrium, the market interest rate will clear the market for credit: just enough funds will be available to satisfy aggregate demand for borrowed funds. Interest rates that are artificially maintained below market rates (i.e. financial repression) imply excess demand for credit, which in turn implies discretionary allocation of credit

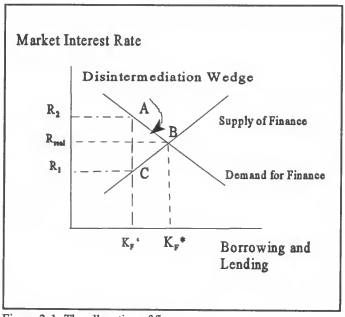

Figure 3-1: The allocation of finance

(i.e. rationing) and results in low levels of investment and inferior quality thereof (McKinnon 1973, Shaw 1973, King and Levine 1993, Lynch 1995). However, Stiglitz and Weiss (1981) have shown that, even under equilibrium conditions, asymmetric information can result in credit rationing on the part of financial intermediaries. In Fig. 3-1, the market for finance clears at R_{real}, the real interest rate and the quantity of finance, K_F*. With perfect information and no transactions costs, the amount K_F* would be allocated in financial markets. If we relax perfect information, implying that both creditor and borrower possess asymmetric or incomplete information sets, a "disintermediation wedge" emerges (triangle ABC). The lender must incur (1) *screening costs* to assess creditworthiness of the borrower, (2) *monitoring costs* to assure compliance with the loan contract and (2) *enforcement costs* to safeguard against default (Hoff and Stiglitz 1990). These costs combine to decrease the effective yield on the loan contract, reflected in Fig. 3-1 as a decrease in the real interest rate from R_{real} to R_1. Likewise, the borrower incurs (1) *search costs* to gain information on the availability of the loan contract and (2) *compliance costs*, e.g. paperwork and other fees as set by the creditor. These borrower costs raise the effective lending rate in Fig. 3-1 from R_{real} to R_2. Both supply and demand costs force the disintermediation wedge to emerge, thereby restricting overall credit allocation to K_F'.

The size of the disintermediation wedge in Fig. 3-1 is largely dependent on the absolute size of the financial sector as well as its spatial composition. For example, as intermediation improves through the entry of new bank branches and other financial institutions, competitive forces exert downward pressure on lending rates, forcing

intermediaries to specialize in information gathering on their target client group(s). Institutions that are unsuccessful in obtaining and processing minimum information on prospective clients will incur disproportionate default rates on loan contracts and eventually exit the industry. Over time, as has occurred in many industrialized economies, lending and deposit rates converge and the disintermediation wedge is minimized.

Heterogeneity of firms can also force the emergence of financial disintermediation. Depending on the level of debt finance sought by the firm, the cost structure of the financial intermediary may preclude it from entering into a lending agreement. Consider the loan contract for HME_x. The market lending rate, r, is applied to loan principal, P_L, resulting in a stream of payments dependent on the prescribed term of the loan (e.g., one year). The lender will base the lending decision on the equilibrium condition $\Sigma installments = C_{FI}$, where C_{FI} equals the fixed costs of intermediation incurred by the lender. Thus, if $\Sigma Installments(P_L, r) < C_{FI}$, as would be the case if (1) loan principal is relatively small or (2) institutional costs of lending are high, the loan contract would not be offered. Recent interviews with commercial lenders in Guyana confirm the existence of "lending floors", effectively excluding relatively smaller firms from access to credit. HME size and desired investment levels thus become determining factors in whether debt financing will be accessible; furthermore, if marginalized firms are capital-constrained, they will lack needed liquidity to pursue desired investment (Feder et al. 1990).

It is immediately apparent that one remedy to these scale effects of lending would entail a menu of interest rates. For example, as loan principal decreases, the nominal interest rate could be raised such that the internal rate of return across the lender's

portfolio is uniform. Such behavior on the part of formal financial institutions is rare in developing countries, even where financial sector reforms have occurred. Thus, there may be factors (e.g. incomplete or asymmetric information) which are not necessarily impacted by financial liberalization and which continue to distort the market with respect to credit allocation. Anderson and Khambata (1985) argue that financial liberalization is only a necessary condition for allocative efficiency of credit; policies that allow risk-sharing among intermediaries (to mitigate information deficits) must also be adopted for liberalization to be effective.

Thus, three factors combine to constrain the mobilization of financial resources for the HME: (1) below-market interest rates or financial repression, (2) asymmetric information and (2) scale economies of lending. Financial repression-- through administratively imposed interest rates ceilings-- distorts the supply of credit available in financial markets by encouraging its discretionary allocation. Screening, monitoring and enforcement costs on the part of the lender decrease effective yield, decreasing the supply of credit. Search costs increase the effective interest rate for credit on the part of the borrower, thereby decreasing demand. Finally, the mere size of the loan may be too small to reach the minimum threshold for a formal financial institution (e.g. commercial bank) to extend the loan contract. If the expected interest income from the potential loan is not sufficient to cover the fixed costs of the financial institution, the loan will not be offered. Each factor provides a basis for the presence of excess demand for credit in developing economies like Guyana.

Attempts to address and satisfy the excess demand for credit, particularly among agricultural firms, resulted in directed credit schemes (as mentioned earlier in this chapter) designed to meet investment needs of the small farm sector, oftentimes with subsidized rates of interest (Adams 1984, Adams and Von Pischke 1992, Donovan 1996). Typically public sector-managed, these schemes targeted firms which were unable to access credit through the formal financial system. Unfortunately, the artificially low interest rates of these schemes yielded similar results as those associated with financial repression. Discretionary allocation of credit, noticeably away from small farmers and toward special interests, did little to mitigate the excess demand for credit.

A class of NGOs arose during the late 1970s and early 1980s specifically to take on lending to the small and microenterprises of developing economies (Adams and Von Pischke 1992, Otero and Rhyne 1994). External funds, allocated from multi- and bilateral institutions (e.g. USAID, The World Bank, The Inter-american Development Bank) served to capitalize the credit operations of these NGOs. Innovative techniques to mitigate information asymmetries and enforce the lending contract, such as *the solidarity group lending* approach, were widely adopted by these credit programs.[1] The Grameen Bank experience is most often cited in conjunction with risk sharing through solidarity groups (Hossain 1988, Besley, 1995). Market or near-market interest rates are usually charged under these programs. However, the long-term sustainability of these institutions,

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[1] *Solidarity group lending* entails self-selection of individuals into groups of five for the purposes of cross-guaranteeing compliance with the lending contract; such cross-guarantee is in lieu of collateral. The approach corresponds to the peer monitoring cited in Stiglitz (1990), which holds that individuals who interact in a variety of non-market settings tend to know each other well and risk-sharing among such individuals can be a strong contractual obligation (see also Besley 1995).

with respect to ability to cover financial and operational costs of capital, is just now coming under scrutiny. Recent studies (Otero and Rhyne 1994, Yaron 1992, Gurgand et al. 1994) consider these financial institutions across two universal parameters: *outreach* (actual coverage of target group) and *sustainability* (ability to generate net profits without subsidies). Results of studies from sub-Saharan Africa, Latin America and Asia indicate that target group coverage is high, but few institutions have been able to sustain net profits (Gurgand et al. 1994, Otéro and Rhyne 1994). Institutional inefficiencies and uncertain future sources of financial capital for onlending operations make long-term sustainability questionable.

While access to investment finance may be constrained in countries with poorly developed financial sectors, indigenous alternatives have arisen to fill the void. The term *informal credit markets* has been coined to encompass those financial institutions which operate outside the regulated sector of the economy. Srivastava (1993) and Ghate et al. (1992) cite four dominant sources of funds in informal credit market, namely: (1) friends and relatives, (2) moneylenders, pawnbrokers, and other sources of untied credit, (3) tied credit, e.g. trade credit, and (4) Rotating Savings and Credit Associations (ROSCAS).

Friends and relatives account for much of informal credit; a recent study in Bangladesh found firms received 75 percent of cash credit from friends, neighbors and relatives (Srivastava 1993). The village moneylender, in times past vilified for presumed usurious behavior, nonetheless serves a vital function in rural communities with little or no access to formal banking services (Hill 1986). *Chit* funds of Thailand and urban curb markets for credit in South Korea service those clients who are preempted from

commercial lending due to adverse risk or cost considerations. ROSCAS are found in many countries; they are known as *ekub* in Ethiopia, *njangis* and *tontines* in Cameroon, *esusu* in Zaire and Liberia, *box-hand* in Guyana and other Caribbean countries and *Key clubs* in South Korea. ROSCA members make regular contributions to a common pool which is then given to each member in turn. Difficulties of asymmetric information are overcome since lenders and borrowers know each other and the social context tends to encourage compliance by all parties (Fry 1995).

In this section, we have detailed the importance of finance, financial access and effective financial intermediation in both the start-up and continued operation of the HME. Formal financial markets tend to shy away from HMEs and other small-scale clients due to information asymmetries. Also, institutional cost structures tend to favor large-scale, lower risk clients. In Guyana, institutions have arisen to fill the credit demand for HMEs; in particular, the Institute for Private Enterprise Development (IPED) has served the small-scale enterprise sector for over ten years. In the next section, the outreach and sustainability of IPED is investigated.

The Institute for Private Enterprise Development

Introduction

In January 1986, the Institute for Private Enterprise Development commenced operations, its objective being to foster the development of non-agricultural, small-scale production in Guyana through the provision of credit and related non-financial services.[2]

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[2] In 1990, IPED became the official name of the Institute. From 1986 to 1990, it was known as the Institute for Small Enterprise Development (ISED).

The nine-member Board of Directors of IPED draws upon leading individuals from the Guyanese private sector and government. Mr. Yesu Persaud, co-founder of IPED, currently presides as Chairman of the Board of Directors. Legally, IPED is a not-for-profit company limited by guarantee; as such all net surplus generated from operations are capitalized.

The Georgetown office housed IPED's operations until 1990, at which time the Institute opened its first branch office in Berbice. In 1991, branches were opened in Linden and Anna Regina, Essequibo. With these new branches, IPED's effective reach extends from the extreme eastern border with Surinam to the northwestern region of Guyana, covering a territory wherein resides 90 percent of the population.

IPED clients are tracked toward two lending programs or "windows". The *Main Window* issues loans from G$ 100,000 (US$ 704) to G$ 5.0 m. (US$ 35,714); the *Micro Window*, as the name implies, issues smaller loans from a minimum of G$ 30,000 (US$ 214) to a maximum of G$100,000 (US$ 704).[3] The two windows differ in the terms offered for the two types of loans. Main Window loans are issued to individual IPED clients for a maximum of sixty months at 21 percent annual percentage rate (a.p.r.); these loans are 100 percent guaranteed by securing sufficient collateral from prospective clients. In contrast, Micro Window loans are group loans (for groups of five individuals) issued for up to eighteen months with an interest rate of 31.2 percent a.p.r. Micro Window group loans are not secured with financial collateral; rather, the group members cross-guarantee each other and thus insure that repayment of the loan takes place as scheduled.

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[3] Unless otherwise specified, the exchange rate is G$ 140/ US$ 1.

Since its inception, IPED's primary source of financial capital has been USAID/PL480.[4] PL480 funds are concessional funds loaned to IPED on terms of 4 to 6 percent for a period of 10 to 15 years, with deferred repayment on principal for the first five years of the loan.[5] The Interamerican Development Bank (IADB) approved SFR 375,000 (US$ 312,500) to IPED in 1988; IPED had fully drawn down these funds as of December 31, 1993. IADB terms are 1 percent commission on principal to be paid semi-annually, with repayment beginning in 1998 for a period of 60 semi-annual payments (i.e. 30 years total). IADB further provided a non-reimbursable grant of SFR 121,500 (US$ 101,250) in the form of a technical cooperation agreement with IPED.[6] IPED has also received donations from The British High Commission, The Canadian High Commission, the Pan American Development Foundation, other private companies and individuals.

Financial services provided by IPED are limited to business credit only. IPED does not function as a deposit-taking institution. The Financial Institutions Act of 1995 establishes strict guidelines for the creation of deposit-taking institutions. In order to become a deposit-taking institution, IPED would be required to officially register as a bank and set aside an initial capital reserve of G$ 250 m. (US$ 1.78 m).

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[4] PL-480 (Public Law 480) was approved by the U.S. Congress in 1957. It authorizes the foreign sale of U.S.commodity surpluses at subsidized prices. Net revenues from these sales (in local currency) are then made available to host country governments, typically for domestic development programs.

[5] For example, loans incurred in 1986 will have principal payments postponed until the end of the sixth year (i.e. 1992). From 1986 to 1992, only interest payments are due; in 1992 and thereafter, payments will include interest and principal.

[6] See *Agreement between the IADB and IPED, LTD: Credit and Technical Cooperation Programme, 1987.*

Financial Analysis

As of 1994, Assets (in current values) totaling G$ 807.567 m. (US$ 5.77 m.) were supported by Liabilities of G$ 522.130 m. (US$ 3.73 m.) and Equity of G$ 285.440 m. (US$ 2.04 m). IPED's *Assets* are consistently financed two-thirds from *Liabilities* and one-third from *Equity* (see Appendix B). *Fixed Deposits (Investments)* have increased as a percentage of Total Assets; however, their contribution to total income has decreased over the five-year period. *Total Liquid Assets (Cash and Investments)* comprise 44 percent of IPED's asset base, representing a 31 percent increase since 1990. *Loans Receivable* declined sharply in 1991, as the economy bottomed out, but have returned to former levels, approximately 50 percent of the total asset base. The high level of liquid assets (44 percent) indicates that IPED may need to place more emphasis on targeting and expanding its client base. It also may indicate, albeit to a lesser extent, the need to further streamline the loan granting process.

Total Assets grew in real terms throughout the period, albeit at declining rates from 1991 to 1994; the same holds for *Current Loans.* Real growth in *Investments* plummeted from 117 percent in 1992 to 5 percent in 1993 and 4 percent in 1994. Return on Assets (ROA) averaged 8.15 percent since 1991. In 1994, ROA was 7.3 percent. One observes that *net income* showed strong growth in 1992, then flattened out in 1993 and 1994. In 1994, *total gross income* declined by 5 percent from 1993 levels. *Interest income* showed impressive yearly growth of approximately 100 percent through 1993; growth was almost flat in 1994 at 1.5 percent.

Investment Income in 1994 was G$ 10.654 m., a decrease of 46 percent from 1992 levels. The sharp downturn in investment income is worrisome. Assets allocated to investments would have generated greater income for IPED as loans. Loan creation and portfolio expansion would have been a better alternative to investments. The basic principle is that IPED needs to maximize the income generating potential of its asset base, as would any financial institution.

An interesting aside to IPED's institutional development is the recent opening of a full-service commercial bank by the Chairman of the Board, Mr. Persaud. In late 1994, Demerara Bank. Ltd. began operations in Georgetown, Guyana as one of the first private commercial banks in the country. Coincidently, IPED's bank accounts (as evidenced by loans checks issued to IPED clients) are presently maintained at Demerara Bank, Ltd. The substantial equity position of IPED--G$285.440 m. (US$ 2.04 m.)--much of which is housed at Demerara Bank, Ltd., undoubtedly assists the bank in achieving its minimum reserve requirements as specified in the Financial Institutions Act of 1995. Furthermore, the high level of liquid assets maintained by IPED (44 percent of total assets) seems to imply a possible conflict of interest between the purported lending goals of IPED and the objectives of Demerara Bank, Ltd.

Total Expenditures also decreased by 6 percent over 1993 levels, following explosive growth in 1992. *Salaries* kept pace with inflation in 1992 and 1993, but only grew at approximately 6 percent in 1994, with inflation at 16 percent. *Provisions for doubtful debts* have averaged 1.15 percent of Total Loans Receivable since 1991.

The profitability of IPED is assessed in Tables 3-1 to 3-3. Performing assets, which are gross loan portfolio plus investments, serve as a base to measure income generated from and associated expenses of IPED's lending operations. For 1994, IPED's performing assets averaged G$ 708.845 m. (US$ 5.06 m.). As a percentage of performing assets, gross income, financial expenses and operational expenses were 15.2 percent, 3.2 percent, and 4.2 percent, respectively. Finally, imputed capital costs were 6 percent of performing assets. Imputed capital costs portray the erosion of the IPED's capital base due to inflation. Note that the imputed capital costs *do not reflect subsidies afforded to IPED via concessional interest rates.* From these percentages, IPED shows a net profit (after financial, operating, and imputed costs) of 1.8 percent of performing assets.

Table 3-1: Imputed Cost of Capital, IPED (Figures in G$ m.)

BALANCE SHEET ITEM	Annual Average (93-94)	Economic Cost/Benefit@ 16 percent	Actual Cost/Benefit	Imputed Cost/Benefit
Concessional Loans	462.811	(74.050)	(22.609)	(51.441)
Equity	240.641	(36.096)	0.00	(36.096)
Property	292.994	46.879	0.00	46.879
TOTAL				(40.658)

[a] Annual inflation rate, 1994 (Ministry of Finance).

Source: Annual Reports, 1993-94, IPED; Ministry of Finance.

Table 3-2: Cost Structure as Percentage of Performing Assets, IPED (1994)
Average Performing Assets (G$ m.): $708.845[a]

Item	Income[b]	Financial Expenses[c]	Operational Expenses[d]	Imputed Cap Costs[e]
G$ m.	108.031	(22.609)	(29.951)	(40.658)
percent	15.2	(3.2)	(4.2)	(6.0)

[a] average of 1993 and 1994 levels

[b] Interest and Investment Income, 1994

[c] Interest on PL 480 loans, 1994

[d] Total Expenses - Financial Expenses, 1994

[e] See Table 3-1

Table 3-3: Profitability Analysis, IPED (as of December 31, 1994)

INCOME/EXPENSE	percent
Financial Income	15.2
Actual Financial Expenses	(3.2)
GROSS FINANCIAL MARGIN	12.0
Operational Expenses	(4.2)
NET OPERATING MARGIN	7.8
Imputed Capital Costs	(6.0)
NET PROFIT	1.8

Note: Figures taken from Table 3-2.

Critics of development finance programs like IPED are increasingly emphasizing the need to make these institutions sustainable. In this respect, sustainability denotes the capacity to cover program costs and capital costs from the revenues generated from the lending operations. Inability to cover these costs implies the continued need for subsidies on the part of these development finance programs in order to stay afloat. Subsidies may take the form of (1) concessional loans or grants, (2) reimbursement of operating costs, (3) certain exemptions to financial regulations, e.g. reserve requirements and (4) tax exemptions (Yaron 1992). Tables 3-1 to 3-3 account for inflation yet do not incorporate the impact of the subsidies received by IPED. Yaron (1992b) develops a Subsidy Dependence Index (SDI) to assess the sustainability of development financial institutions. Gurgand et al. (1994) calculate the SDI for six rural financial institutions in sub-Saharan Africa. Khandker et al. (1995) calculate the SDI for Grameen Bank in Bangladesh.

Formally, the SDI is a ratio that measures the percentage increase in the average on-lending rate required to compensate a financial institution for the elimination of subsidies in a given year while keeping its return on equity equal to the approximate nonconcessional borrowing cost (Yaron 1992). Calculating the SDI for IPED first requires a summation of all subsidies received by IPED. Then, these aggregate subsidies are taken as a ratio against the return on the aggregate IPED loan portfolio. Table 3-4 calculates the SDI for IPED from 1992 to 1994.

Table 3-4: Subsidy Dependence Index, IPED, 1992-1994

Year	(A) Capital Funds Subsidy	(B) Net Equity	(C) Loan Portfolio	(D) Weighted Interest Rate	SDI (A+B/C*D)
1992	75.812	(18.577)	149.190	0.214	1.79
1993	56.835	(21.941)	277.350	0.214	0.58
1994	63.032	(12.476)	375.790	0.214	0.63

Source: IPED Financial Statements, 1992-1994.

The SDI gives the *required increase in on-lending rate to counterbalance the impact of subsidy elimination*. For example, in 1994, IPED's weighted average interest rate of 21.4 percent would need to be increased to 34.0 percent if all subsidies were eliminated. Note also that the SDI shows a three-fold decline from 1992 to 1994, indicating that IPED is moving toward greater long-term sustainability. The slight increase in the SDI from 1993 to 1994 resulted from the 35 percent increase in portfolio size compounded by the lower than adequate interest rate of 21.4 percent.

Portfolio Analysis: Main Window

The Main Window constitutes approximately 94 percent of total IPED lending. As of July 1995, the Main Window portfolio totaled G$ 499.550 m (US$ 3.568 m.). With 1,026 total outstanding loans, the average outstanding loan value is G$ 0.487 m. (US$ 3,479). Rice farming constitutes the bulk of IPED lending, with 54 percent of active loans and 61 percent of total outstanding balances. In general, agricultural loans (including fishing) make up 81 percent of total active loans and outstanding balances. The remaining portfolio consists of light industry and food processing (e.g. furniture, crafts, fish dehydration). Berbice carries the largest share of Main Window loans (308 total), of which two-thirds are rice-related.

All Main Window loans carry an interest rate of 21 percent a.p.r., of which 1.5 percent goes to credit life insurance and 1.5 percent is charged for training activities. When the associated transactions costs are included, an effective nominal interest rate of 22.2 percent results. The Main Window has a loan ceiling of G$ 5.0 m. and a floor of G$ 100,000.[14] Average loan term is twenty-four months; average monthly installment is G$ 24,927 (US$ 178).[a]

The relative weight of agriculture in the Main Window portfolio is to be expected, given agriculture's importance in the Guyanese macroeconomy (Fig. 3-2). Nonetheless,

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[14] IPED recently signed an arrangement with the European Development Bank to receive funds for medium-scale lending (i.e. in excess of G$ 5.0 m.).

IPED must still be proactive in building the non-agricultural component of the portfolio. Rice loans have become a productive and convenient niche for IPED; as a group these loans also perform well. However, IPED should consider the merits of diversifying the lending portfolio, while maintaining rice loans as a solid foundation. Diversification could also address the dual objective of expanding the client base and combating excessive liquidity.

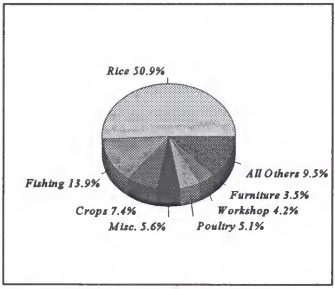

Figure 3-2: Portfolio volume by activity, Main Window

Small-scale credit programs like IPED are often beset with loan default. Therefore, close analysis of loan arrears and delinquency rates is important, both to assess the quality of the overall portfolio and evaluate the ability of IPED to determine credit risk and enforce repayment schedules. Table 3-5 presents arrears rates and portfolio at risk levels for the Main Window portfolio. Loans past due by one or more days are considered to be in *arrears*, while *portfolio at risk* identifies the percent of the total loan portfolio subject to nonpayment.

As of July 31, 1995, 12 percent of the Main Window portfolio was in arrears; 20.89 percent of the portfolio was at risk of default. By region, arrears are minimal in Berbice (1.23 percent); Linden's portfolio, on the other hand, is almost completely delinquent. Reasons for the poor experience in Linden center around the high subsidies

received by much of the town during the heyday of bauxite production undertaken by the state enterprise GUYMINE. Furthermore, GUYMINE employed the vast majority of Linden's inhabitants. Operations at GUYMINE deteriorated substantially in the early 1990s and Linden continues to adjust to a more private sector orientation. The poor lending experience in Linden has caused IPED to significantly scale back its operations there since early 1994. The Georgetown region also stands out in its delinquency levels, with 39.75 percent of its portfolio at risk.

Table 3-6: Delinquency Analysis by Region, Main Window, IPED, as of July 31, 1995

Region	Portfolio (G$ m.)	Arrears Rate (%)	Portfolio at Risk (%)
Georgetown	297.34	12.8	24.12
Essequibo	78.69	5.02	8.78
Berbice	112.27	1.23	12.92
Linden	11.24	98.76	100.00
OVERALL	499.54	12.10	20.89

Source: Portfolio Delinquency Report, July 31, 1995

Diversification may improve the arrears but should not be viewed as a cure all. In fact, the most diversified regional portfolio, Georgetown A, is also the highest in arrears and portfolio at risk. Improved capacity on the part of the Business Counselors will be required to proactively screen out and recruit the best potential clients for addition to the portfolio.

Provision for arrears appears to be inadequate for IPED's arrears experience. The provision of G$ .664 for 1994 represents 0.13 percent of the total loan portfolio. With 12

percent of the portfolio in arrears and 21 percent of the portfolio at risk in July 1995, the provision for bad loans should be increased to reflect actual experience. While IPED maintains a policy of pursuing legal recourse against all defaulters (i.e. there is no bad debt write-off), bad debt is in fact a reality of all credit institutions. More specifically, 88 percent (G$ 47.956 m.) of total Main Window arrears are in excess of 90 days past-due. In similar institutions, this would be classified as bad debt and written off the accounts. While it is recognized that the Guyanese legal system is indeed slow to process IPED's legal claims against defaulting clients, both provision and write off of debt are commonplace in credit institutions, as would be recoveries if and when they are received.

Portfolio Analysis: Micro Window

The Micro Window presently constitutes a mere 6 percent of total IPED lending. As of July 31, 1995, The Micro Window portfolio consisted of 210 loans with an overall outstanding balance of G$ 31.79 m. (US$ 0.227 m.). The bulk of these loans constitute *solidarity group loans* in which five individuals band together to cross-guarantee loan repayment. Average loan size per group totaled G$ 0.151 m. (US$ 1,079). Initially, micro loans are extended for a maximum of G$30,000 per individual or G$ 150,000 (US$ 1,071) per group. Following successful repayment of the first credit, loan ceilings increase to G$ 45,000, G$ 62,500, and finally, G$ 100,000, after which the group members can "graduate" individually to the Main Window for further lending.

Micro loans carry an interest rate of 31.2 percent a.p.r. for periods of three to eighteen months. Each individual within the solidarity group is further obligated to set aside G$ 100 per week in an Emergency Fund, which cushions the group members in the event of unforeseen difficulties (e.g., lapse in repayment). Two activities - cash crops and poultry - account for 65 percent of total micro loans and 66 percent of the total micro outstanding portfolio (Fig. 3-3). The bulk of the Micro portfolio (72 percent) is concentrated in Georgetown region.

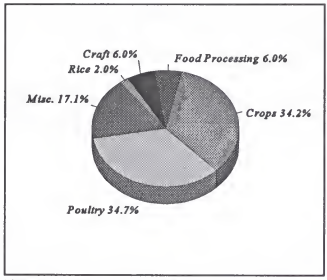

Figure 3-3: Portfolio volume by activity, Micro Window

IPED's strategy regarding the Micro Window involves channeling credit exclusively through community-based NGOs. Many of these NGOs are organized according to production (e.g. rice, crafts, small animals); a variety of religious and common interest NGOs are also represented. IPED helps to strengthen these NGOs through interaction with the IPED field credit officers. When NGOs can demonstrate adequate leadership and management capacity, members of the organization can then self-select into solidarity groups to access IPED credit. Over the thirty months since instituting the Micro window, individual loans totaling 1,271 have been disbursed through approximately 71 NGOs throughout Guyana.

The Micro window has grown dramatically since inception two and one-half years ago yet still constitutes a rather insignificant portion of total IPED lending. Nonetheless, there are lessons which can be learned from the experience to date with the Micro window. The IPED experience with solidarity group lending suggests its viability as a means of securing repayment of loans. Central to the success of the solidarity group approach is the self-selection of group members, and as such the screening out of potential defaulters by the borrowers. In effect, IPED has delegated the screening and monitoring function of the loan applicant to the members of the group; this is commendable in that it economizes on the scarce time and human resources of the Credit Department, namely the IPED field credit officers.

Furthermore, the remarkably low arrears rates of the regions with respect to the Micro window proves that the poor can be responsible borrowers even in the face of no financial collateral. Essequibo shows no arrears while Berbice has arrears rates of 1.16 percent. As with the Main Window, the dominance of agriculture in the Micro window (71 percent of the total portfolio value) begs the question of more targeted credit promotion toward the non-agricultural, small-scale industrial sector.

Target Group Orientation

Of a total of 829 Main Window loans granted in 1994, 51 percent were obtained by Joint borrowers, usually husband and wife. In fact, when one spouse approaches IPED for credit, it is customary to require the signature of the other spouse, primarily to bolster the security of the loan. As a class of borrowers, females constituted 26 percent of new loans in 1994, an increase of 15 percent from the previous year (Fig. 3-4). Furthermore,

there was a four-fold increase in total loans to women in 1994, with 283 loans granted. Overall, the portfolio (combined Main and Micro windows) grew 62 percent in 1994 in total loans granted and continued to rely heavily on agricultural borrowers (Fig. 3-5).

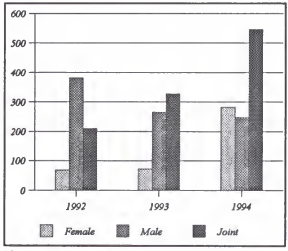

Figure 3-4: New loans by gender, Main Window

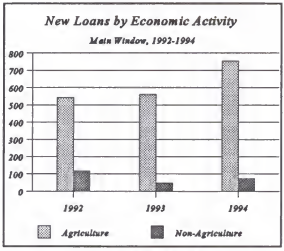

Figure 3-5: New loans by economic activity, Main Window

IPED has improved its outreach with the advent of the Micro window. By extending its client base to those with the smallest credit needs, IPED has shown that the low end of the market can positively contribute to overall portfolio performance. In the absence of IPED, many of these "micro" clients would have no viable alternative for credit services.

The supervised credit which IPED offers further indicates that it goes beyond the traditional lending model followed by commercial banks. That it provides a larger array of services implies greater cost to the Institute, and in turn the need to generate greater revenue from those services. The current 3 percent premium IPED charges may not be sufficient in light of the added work load (e.g. field collection of loan payments). In fact, only 1.5 percent of the 3 percent actually contributes to IPED's supervised credit activities

(i.e. the training of clients); the remaining 1.5 percent is a direct charge for credit life insurance. This also begs the question of whether IPED need offer such non-financial services. While no client would want to see an increase in interest rates, the fact remains interest must be commensurate with both the risk undertaken and the services provided. This will become more important as further repayments begin on USAID/ PL480 loans or in the event commercial sources of capital are required by IPED.

Comprising the target market for IPED micro lending are the following segments: (1) school leavers and dropouts, (2) unemployed and under-employed, (3) Amerindians, (4) the disabled, and (5) Women in Development. The total loan portfolio generated approximately four jobs per loan in 1994; since 1990, employment generation has ranged between four and five jobs per loan granted.[15]

For many reasons, commercial banks and other formal sector institutions are unwilling to service IPED's client base. First, IPED's loan ceiling of G$ 100,000 is actually the lending *floor* in at least one bank interviewed (Guyana Bank for Trade and Industry). Second, that IPED takes its product (i.e. credit and related services) to the client sets it apart from the commercial banking sector. Third, and no less important, the clients value the supervisory component of IPED credit; indeed, they pay for it through the 1.5 percent addition to the loan interest rate.

Competitive Analysis

At present, IPED and two other institutions provide the bulk of financial and other services to the Guyanese microenterprise sector (Table 3-6). *Scotia Enterprise*, a branch

[15] Job creation is measured by changes in employment for each IPED project before and after receipt of loans.

of ScotiaBank/ Canada, is unique in that it is part of the commercial banking sector; it thus demonstrates that commercial banks can provide loans to the microenterprise sector. Established in May 1993, Scotia Enterprise follows a Grameen-type lending scheme similar to IPED. Scotia's clientele are at present exclusively found in the greater Georgetown vicinity. In lieu of financial collateral, solidarity groups of five to six individuals are formed to cross-guarantee the loan. These groups form on a voluntary basis. Most loans are used for working capital requirements rather than for fixed investment. Businesses which have been in operation for at least six months are eligible for finance through Scotia Enterprise.

Scotia's strategy is minimalist in that it focuses on the delivery of credit to the microenterprise and places almost no emphasis on business management training or other non-financial services. Loans are granted for periods of four to six months at an interest rate of 25 percent a.p.r. Loans are scheduled for repayment immediately upon disbursement, with payments required every two weeks. Any overdue payments are assessed a late fee of G$ 250 per day. The initial loan is for G$ 15,000 to each member of the solidarity group. Upon successful repayment, loan levels increase to G$ 25,000, G$ 40,000, G$ 75,000, up to a maximum of G$ 500,000. However, no client has yet exceeded a loan level of G$ 100,000. Ten working days are required from receipt of application to disbursement of loan.

Table 3-6: Summary of Selected Guyanese Microlending Institutions

Institution	IPED	SCOTIA ENTERPRISE	CD, INT'L
Year Started	1993	1993	1993
Source of Funds	PL-480, IADB	Mobilized via Savings	European Union
Loan size	Max.: G$ 100,000 Min.: G$ 30,000	Max: G$ 500,000 Min: G$ 15,000	Max: G$ 700,000 Min: G$ 100,000
Interest Rate[1]	32.4%	25%	25%
Collateral	Not required	Not required	Not required
Forced Savings	Yes	No	No

[1] a.p.r.

As of August 1995, Scotia Enterprise had disbursed 4,492 loans totaling G$ 120 m. (US$ 869,565); average loan size was G$ 26,714 (US$ 194). Seventy percent of these loans have been disbursed to women entrepreneurs. According to Scotia, the delinquency rate for micro loans is 1 percent.

Scotia Enterprise generates the funds for its microlending initiative from the savings of the borrowers themselves. In other words, the lending operation is *fully mobilized* from these savings. While this is standard practice for commercial banks, it is somewhat rare in the realm of microenterprise finance. Furthermore, Scotia may have an advantage in this regard: it is the only microenterprise institution (among the three detailed here) legally permitted to accept deposits, according to the Financial Institutions Act of 1995.

The Small Business Credit Initiative of Cooperation for Development (CD), International, a Guyanese affiliate of the larger CD organization based in the United

Kingdom, has been in operation for two years and is financed with funds provided by the European Community. The target sector for CD assistance is generally defined as any person or group in a productive enterprise unable to obtain a loan from commercial banks. In practice, such businesses have been microenterprises. It began in December 1993 with an initial tranche of G$ 53,000,000 (US$ 384,058); the first loan was disbursed in April 1994. CD is currently on a project cycle which terminates in 1997.

As of November 1995, CD's total outstanding loan portfolio stood at G$ 14 m. (US$ 101,449). With 92 loans outstanding, average loan size was G$ 152,713 (US$ 1,102). Interest on these loans is set at 20 percent a.p.r plus an administrative fee of 5 percent. Approximately 30 percent of loans go to women and 45 percent constitute non-farm activities. No collateral is required for the loans. Through October 1995, CD enjoyed a repayment rate of 86.3 percent on its lending operations.

Other direct competitors with IPED include (1) Guyana Bank for Agriculture and Industry/ Guyana National Commerce Bank (GAIBANK/GNCB), (2) Red Thread, (3) Womens' Affairs Bureau and (4) Women Development Window. GAIBANK is a public sector financial institution exclusively involved in agricultural lending, mostly in the rice sector. GAIBANK recently merged with GNCB, allowing it to expand into deposit-taking as well as credit delivery. Standard loans are at 17.5 percent a.p.r.; foreign exchange loans, for the purchase of capital equipment and inventory from overseas, are at 15 percent a.p.r. Red Thread targets women exclusively in its programs; it extends credit (at little or no interest rate) but does not function primarily as credit granting institution. Womens' Affairs Bureau a government program under the Ministry of Labor, provides

credit exclusively to women at 6 percent by means of a revolving credit fund established with resources from UNICEF. As of February 1995, Womens' Affairs Bureau had disbursed 54 loans averaging US$ 116 each. Finally, the Women Development Window--with membership of one hundred members-- dispenses loans of G$100 to G$1,500, interest free.

The Future of IPED

IPED has demonstrated its ability to successfully address the credit needs of the small-scale, primarily agricultural, borrower. Furthermore, through a program of supervised credit delivery, IPED contributes to the economic growth and development of rural Guyana. Notwithstanding, there is scope for improved operations within the Institute.

The positive performance achieved by IPED thus far is directly related to its capacity to target and deliver credit to the agricultural sector, especially the rice sub-sector. As agriculture will continue to loom large in the Guyanese economy, it is likely that IPED's portfolio will remain concentrated in the agricultural sector for the foreseeable future. Having recognized this, IPED can nonetheless begin a gradual process of diversification of its loan portfolio, as a means to mitigate overall risk of bad debt. Data from the microenterprise survey (presented in Chapter 6) indicate that no more than 3 percent of HMEs have accessed credit from IPED or similar institutions. This implies a broad scope for expanded outreach on the part of IPED in making credit available to small-scale borrowers.

On a larger scale, it is debatable whether IPED can be a prototype for innovative lending to the HME sector. IPED has benefited from the subsidized loans and grants dispensed by USAID, IADB and other agencies; future small-scale credit programs will likely be required to mobilize their own resources in establishing a capital base from which to undertake lending operations. Two points indicate a window of opportunity for potential entrants. First, IPED has been able to generate a net profit (Tables 3-1 to 3-3). Second, as the SDI calculations in Table 3-4 show, the interest rate required to compensate for subsidy elimination is roughly that which is currently charged to the Micro Window; the Micro Window is performing well with regard to arrears experience. Thus, the small-scale borrower can borrow at these higher interest rates and still maintain repayment obligations.

IPED should consider the possible advantages of savings mobilization as a means of increasing its capital base and weaning itself from the subsidized funds received in the past. Undoubtedly, savings deposits would require a higher interest rate that the 4-6 percent currently paid on PL-480 loans; however, the long-term perspective on the availability of continued PL-480 monies is unclear, thus requiring some alternative avenues for financing to at least be identified, it not adopted. IPED has already established a working relationship in rural Guyana as a lender; this will expedite any future extension of its services to deposit-taking. Additionally, as its credit clients maintain and grow their respective businesses, increased incomes imply possible additional savings--funds which IPED is uniquely poised to mobilize. Should IPED choose to cover the other side of the financial intermediary role--savings mobilization--it will entail full graduation into the formal financial sector and as such compliance with the Financial Institutions Act.

CHAPTER 4
TOWARD A THEORY OF THE HOUSEHOLD MICROENTERPRISE

Introduction

All firms have a starting point that can be traced back to the founder of the firm. Furthermore, while the size distribution of currently functioning firms runs the gambit from Fortune 500 multinational corporations to the single-person enterprise, the origins of these firms lie in the household. In most cases, the firm is founded by one individual; thus, both the initial formation of the enterprise as well as the early growth and development are products of the founder's family (Casson 1982). The household also provides a convenient, internal source for labor and capital to be utilized in firm production. In fact, institutional rigidities in markets external to the household may motivate (indeed force) the founder to seek out these internal sources for inputs. The transaction costs may spur the formation of the family enterprise as opposed to seeking out wage employment in the external market (Coase 1937, Casson 1982).

We need a theory that is robust enough to explain the observed characteristics of both rural and urban microenterprises. Agricultural household models provide a logical starting point since they characterize the consumption and production decisions of the household. These models couch enterprise activity within the rubric of the family. In agricultural households, families both produce and consume--an obvious yet overlooked

fact in prior modeling--implying that countervailing effects of substitution and profit will drive the reallocation of household resources. Just as rural households face a resource constraint in their production/consumption decisions, the urban household faces a similar resource constraint and therefore can be analyzed following a similar framework.

Next, it is important to identify the outside force or catalyst which cues the household to reallocate its resources. More to the point, why would the household choose to form an enterprise and how might that decision be affected by wage labor opportunities? How does enterprise formation affect household production? The opportunity for profit is typically this signal to the entrepreneur; there is no reason to presume otherwise for the household. Expected non-contractual costs motivate the household to undertake market production. Such expectations are predicated on information about market demand, combined with the household's ability to marshal its existing resources and coordinate the acquisition of hired resources--its *entrepreneurial capacity*. Friedman (1976) identified entrepreneurial capacity as the quality which firms utilize in marshaling and coordinating these resources. Household firm formation is related to the level of household entrepreneurial capacity; this capacity differentiates the *ownership* of resources from the *deployment* of resources.

In this chapter, a model of the agricultural household is combined with Friedman's concept of entrepreneurial capacity to form a model of the household microenterprise. Further extensions to the model include (1) internal and external labor force participation in household production and (2) sources of internal and external capital used to finance household production. The household's resource constraint dictates the scale of the

enterprise. Limited entrepreneurial capacity will tend to be associated with smaller firms. Where entrepreneurial capacity is present in sufficient quantities to permit the acquisition of hired resources, availability of and access to finance can be a binding constraint on the household enterprise during start-up and throughout continued operations. Finance will also impact the enterprise's ability to survive.

A Model of Enterprise Formation

The model set forth here is a variation of the agricultural household model delineated by Singh et al (1986). Specifically, the household is assumed to be a one-individual household producing one commodity. The household is assumed to maximize utility according to the function:

$$U = U(X_h, X_m, X_l) \tag{4-1}$$

where X_h defines the level of household commodity consumed, X_m, market goods consumption, and X_l, leisure. Eq. (4-1) is subject to four constraints. First, the household faces an income constraint,

$$p_m X_m = p_h (Q - X_h) - w (L - F), \tag{4-2}$$

which defines its capacity to purchase market goods. Market goods (X_m) are purchased at price p_m, whereas the funds with which these goods are obtained derive from two sources, namely: (1) marketed surplus of household commodity production and (2) net wage labor earnings. For simplicity, our household produces one commodity, which is both consumed by the household (X_h) and marketed outside the household (Q- X_h) at

price p_h. The household is a price taker in the marketing of its surplus production. Thus $p_h\ (Q\ -\ X_h)$ is gross revenue from surplus commodity production.

The final term in the eq. (4-2)--$w(L\ -\ F)$--denotes net cash flow from total labor input to commodity production (L) and total family labor input (F). Family labor input and total labor input to commodity production need not be the same. For example, L is commodity labor input from within the household as well as any hired labor from outside the household. Conversely, family labor input F can be devoted to either household production of commodity Q or hired outside the household. It will be useful to further define F as follows:

$$F = F_h + F_m \ . \tag{4-3}$$

Total family labor input consists of family labor input to commodity production (F_h) and family labor input employed outside the household (F_m). Where $L\ -\ F > 0$, the household hires outside labor for its commodity production; where $L\ -\ F = 0$, all family labor input is absorbed by household commodity production. If

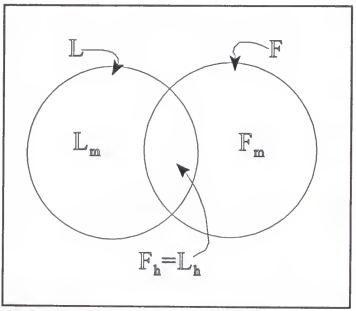

Figure 4-1: Household labor and family labor input

$L - F = 0$ the household sells labor to off-household production. The exogenous wage rate w is earned by all labor input, whether that found in L or that found in F.

Now, the question arises as to how capital should be specified within the model. Singh et al. consider only land (A) in their model, which is reasonable if the context is strictly agricultural. Yet, our model must be adaptable to both rural and urban circumstances, which implies a broader concept of capital. While the household's human capital is represented by labor in eq. (4-2) and (4-3), neither physical nor financial household capital is explicitly modeled. If used in production, these inputs should accrue a return. Household physical and financial capital, if depleted in production, may not be available (either in part or in whole) for other household activities, such as leisure. For these reasons, it is necessary to extend the model to include an explicit accounting of capital within the household.

Let K be the sum total of capital deployed in the production of the single commodity Q. Here, K does not include time since we have already given it a separate specification. Rather, K constitutes those physical capital goods and financial assets used in commodity production. Similar to family labor input, the household also possesses household capital stock G. Two uses for family capital stock are possible, as noted in the following identity,

$$G = G_h + G_m \tag{4-4}$$

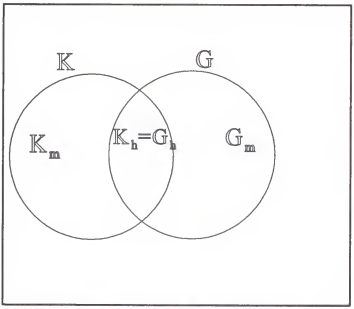

Figure 4-2: Household Capital and Family Capital Input

where G_h is family capital stock devoted to commodity production and G_m is family capital stock allocated to off-household production. As with family labor, not all family capital stock need be used in household commodity production.

Household financial capital is also included in G. Household financial capital is obtained from savings, which in turn are a function of the marketed surplus of commodity production, off-household wage income, returns to household capital hired out to off-household production, and remittances. Eq. (4-2) is thus revised to show capital usage within the household as follows:

$$p_m X_m = p_h (Q - X_h) - w (L - F) - r (K - G) . \qquad (4\text{-}5)$$

Where $K - G > 0$ the household employs external capital in its production; where $K - G < 0$, the family deploys capital outside the household, receiving the rental rate r.

The third constraint is a time constraint. Each household has T disposable time,

which is equal to a twenty-four hour day. Eq. (4-6) defines the possible uses of T.

$$T = X_l + F \tag{4-6}$$

Household time is composed of leisure (X_l) and family labor input (F).

A production function specifies the technology used for commodity production and is given by

$$Q = Q(L, K) . \tag{4-7}$$

Since we have but one commodity in the household, Q is simultaneously consumed and marketed. The household production function specifies the relationship between inputs--labor (L) and capital (K)--and output (Q) and implies the presence of a fixed factor, *entrepreneurial capacity* (Friedman 1976).[1] Entrepreneurial capacity is a fixed factor of production for the household. It is also unique in that the entrepreneurial capacity of one household has no perfect substitute within another household. The household's entrepreneurial capacity reflects its unique ability to combine the given input mix.

Entrepreneurial capacity, while not an explicit component of the household production function specified in eq. (4-7), is nonetheless among the most important inputs to the production process. Perhaps the best analogy of the importance of entrepreneurial capacity can be taken from another discipline--physics. For example, the sum total of

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[1] Singh et al. (1986) originally specified the production function as $Q=f(L, A)$, where A is the household's fixed quantity of land. Here, I use capital (K) as a more flexible input suitable for both rural and urban households.

labor and capital--either hired or owned by the household--reflects the potential for production, a concept similar in kind to potential energy. Entrepreneurial capacity, then, embodies the binding force which activates the input set and carries out production. Entrepreneurial capacity converts potential energy into kinetic energy. The analogy also helps to explain the size distribution of household firms, in that, *ceteris paribus*, firm size is determined by household entrepreneurial capacity. Those households with relatively low entrepreneurial capacity, regardless of their labor and capital resources, will found and operate small-scale enterprises or microenterprises. These operations will tend to remain small since entrepreneurial capacity is exhausted before labor and capital resources. Conversely, household enterprises with relatively high entrepreneurial capacity are limited in scale by (1) their owned labor and capital resources and (2) the labor and capital resources they can hire. In other words, the household may be "entrepreneurial rich" yet "resource poor".

The constraints can be collapsed into a single resource constraint for the household. First, substitute eq. (4-3) and eq. (4-4) into eq. (4-5) and rearrange terms to obtain,

$$p_m X_m + p_h X_h = p_h Q - w(L - F_h) - r(K - G_h) + wF_m + rG_m \qquad (4\text{-}8)$$

Next, multiply eq. (4-6) by the wage rate w and rearrange terms to obtain,

$$wX_l = w(T - F) \qquad (4\text{-}9)$$

Finally, add eq. (4-8) and eq. (4-9) and substitute in eq. (4-6) to obtain the single resource

constraint,

$$p_m X_m + p_h X_h + w X_l = w(T - F) + [\, p_h\, Q(L, K) - w(L - F_h) - r(K - G_h)] + wF_m + rG_m \quad (4\text{-}10)$$

Eq. (4-10) represents the sources and uses of resources within the household. Households purchase market goods X_m at price p_m, "buy" household-produced goods X_h at market price p_h, and purchase their leisure X_l at an implicit price equal to the exogenous wage rate w. These three areas constitute the sum total of household resource use. Alternatively, there are three sources by which these uses are financed, namely: (1) wage labor income from off-household work (wF_m), (2) residual income ($p_h\, Q(\, L, K\,) - w(L - F_h)$), and (3) "psychic income" ($w(T - F)$). Here, $T - F$ represents disposable time net of family labor input. In essence, $T - F$ is the household time available for leisure. Both wage labor and residual income produce cash flow; "psychic income" denotes an implicit return to some product, in this case, leisure.

Residual income is given by the term $p_h Q(\, L, K\,) - w(L - F_h) - r(K - G_h)$, where the first term defines the gross revenues from the marketed surplus of the household commodity; the second and third terms embody the labor and capital costs, respectively, associated with production. For the agricultural household, residual income is derived from the sale of surplus commodity production, net of labor and capital costs. For the non-agricultural household, that which the household currently produces for internal use is now made available to the market for purchase, thereby generating revenues. Transaction costs and enforcement costs are minimized by hiring needed labor from within the family. Social ties are usually strongest within the family; the entrepreneur

also knows family members better relative to the rest of the labor market (Casson 1982). The composition of the labor force between family labor input and external labor sources can be expected to change over time as both the quality and quantity of labor demanded by the household enterprise changes.

Note the terms $r(K - G_h)$ and rG_m. Both the rental rate of capital and the return to hired capital is given by rate r. Residual income is reduced by the cost of capital $r(K - G_h)$. Where $(K - G_h)$ is positive, hired capital from outside the household is needed for commodity production; where $(K - G_h)$ equals zero, the household hires capital to off-household production.

The presence of a marketable surplus suggests that the household has satisfied its own demand for the commodity being produced. Not all households will meet or exceed this minimum production requirement and thus will not be residual income recipients. The entrepreneurial capacity of each household is embodied in its unique production function; this quantifies the household production capability for a given set of inputs (Friedman 1976). Entrepreneurial capacity will differ across households and will further vary *within the household* as the input mix changes. For example, no two households are expected to cultivate corn with the same economic efficiency (although it may occur nonetheless) just as the household's capacity to produce corn will differ from its capacity to produce cabbage. It is the ability to effectively combine inputs to generate production which defines entrepreneurial capacity. Hence, as this capacity varies, households will differ in maximum production for any given input mix.

Entrepreneurship on the part of the household must now generate sufficient revenues from marketed surplus commodity production to satisfy both the payment of wage labor and the cost of capital. Where non-market goods constitute household capital (as in homemade tools and other supplies), r represents the implicit cost of resource depletion. In all other cases, r can be considered the replacement cost of that portion of the capital stock deployed in commodity production.

The Catalyst for Firm Formation: Entrepreneurial Rent

Now, provided that the household generates surplus production which could potentially be made available to the market, what will determine whether this actually takes place? The incentive for market entry is a function of the rent which accrues to household entrepreneurial capacity. More precisely, it is the *expected rent from entrepreneurial capacity* which motivates the household toward market entry. Thus, identical market conditions can lead one household to engage in market production while another rejects the opportunity; both decisions are directly related to the level of entrepreneurial capacity found in the household. Simply put, the perception of an opportunity to obtain rent drives the household toward reallocating its existing resources and gearing up for market production.[2]

Since perception is subjective, the actual presence of an opportunity does not guarantee its perception; neither is the perception sufficient to confirm the presence of the

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[2] Geroski (1991, 1995) depicts expected profits (π^*) as a "switch" to signal entry into the industry by a firm. Where $\pi^* > 0$, the firm enters the industry; otherwise, no entry takes place.

opportunity. As Kirzner noted, the entrepreneur "sees" opportunity where others do not.[3] Thus, *entrepreneurial capacity* has two facets: one partially observed by the output generated by the household, and the other evidenced by the propensity to engage in market exchange led by the perception of rent.

Now, if entrepreneurship is such a good venture, why doesn't every household pursue it? Can the certainty of wage labor income outweigh the expectation of entrepreneurial income at some future date? Certain households will not exploit entrepreneurial activities because they are wholly unable to identify such activities in the first place. For these households, there is zero expectation of entrepreneurial income; their only option is wage labor.

That some households are unable to identify and exploit entrepreneurial opportunities further implies the potential for market power on the part of those select households which are entrepreneurial. In fact, the existence of an entrepreneurial residual in itself implies some degree of market power which permits the accumulation of rents. These rents are themselves a major stimulus in the tradeoff between strict household commodity production and entrepreneurial commodity production for the market and are based on a comparison of current utility (from household commodity production) and future utility (via increased wealth generated from entrepreneurial market production).

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[3] To quote Kirzner (1985), "It can be stated with considerable confidence that human beings tend to notice that which is in their interest to notice. Human beings notice 'opportunities rather than 'situations'. They notice, that is, concatenations of events, realized or prospective, which offer pure gain." He gives the following example. "Two individuals walk through the same city block teaming with hundreds of people in a variety of garbs, with shops of different kinds, advertising signs for many goods, buildings of different architectural styles. Each of these individuals will notice a different set of items out of these countless impressions impinging on his senses. What is noticed by the one is not what is noticed by the other. The difference will not merely be one of chance. It is a difference that can be ascribed, in part, to the *interests* of the two individuals. Each tends to notice what is of interest to *him*."

Bear in mind that, under the standard assumption of complete information, the household would at best be indifferent to any form of entrepreneurial endeavor, the reason being that all households would equally perceive the opportunity and exploit it. Opportunity for rents would be eliminated and the incentive for entrepreneurship diminishes. Only when information is incomplete *ceteris paribus* will there be a potential for rent accumulation to those households which possess or acquire the information needed to undertake entrepreneurship (Cantillon 1755, Kirzner 1989, Jovanovic 1982).

The Hazard of the Household Microenterprise

The previous section provided the seeds for understanding how firm formation takes place within the context of household production. Households undertake market production and obtain entrepreneurial income as a response to the perceived potential for rent to the entrepreneurial capacity. However, once the household firm initiates market exchange, the emphasis shifts away from entry and toward market survival and its converse, exit from the industry. In this section, a theory of the survival of the household enterprise is discussed, along with those variables believed to influence it.

The literature on firm survival tends to draw on the model presented by Jovanovic (1982) which lays out the selection and evolution of firms within an industry. This *learning by doing* model follows a Bayesian design in that firms survive and thrive by continuously evaluating their particular cost minimizing experience within the industry, incorporating past information into current decisions and reassessing whether their managerial capacity is sufficient to compete in the industry over the long-run. Over time,

those firms which find that their cost structure remains higher than the known industry standard will fail and exit the industry. More efficient firms will assess their performance positively, remain in the industry, and survive. The Jovanovic model is presented in detail below.

All firms in a given industry are price-takers and generate homogeneous output (Q), as previously specified in eq. (4-7). Production is subject to an underlying cost function, $c(Q)$, with the standard properties of $c'(Q) > 0$ and $c''(Q) > 0$. Total costs are given by $c(Q_t)x_t$, where x_t is a random variable independent across firms; as such, x_t can be thought of as those factors of production required to obtain output Q. Recall that in our model these factors include internal and external labor, physical capital and financial capital; however, as a group, these factors may be either tangible or intangible. Of primary concern in the Jovanovic model is the intangible factor ***managerial ability***.

Now, suppose $x = \xi(\eta_t)$, where $\xi(\cdot)$ is a positive, strictly increasing and continuous function and

$$\eta_t = \theta + \epsilon_t, \quad \epsilon_t \sim N(0,\sigma^2) \ iid \tag{4-11}$$

Firms with larger θ will generate larger x_t, incur greater costs, and be less efficient at all levels of output. The ϵ_t are firm-specific shocks, independent over time and across firms.

Firms are identical in the model, except in their managerial efficiency. Some firms are more efficient at all levels of output, implying that for any two firms i and j, the following relationship will hold: $\theta_i \gtrless \theta_j$. No firm knows its own θ, but it does know the exact form of $\xi(\cdot)$ and the variance of ϵ_t, so that by observing its own costs at time t it

can infer a value of η_t. Finally, the firm chooses the level of Q which maximizes expected profits (or, as stated previously, expected rents to entrepreneurial capacity),

$$\max \quad [p_t Q_t - c\ (Q_t)\ x_t^*] \tag{4-12}$$

Note that x_t^* represents the *expectation* of x_t, conditional on prior information before time t concerning η. Thus, the output decision is made before time t, and conforms to the following partial derivative,

$$\frac{\partial Q}{\partial x_t^*} = \frac{-c'}{x_t^* c''} < 0 \ . \tag{4-13}$$

As Evans (1987) suggests, eq. (4-13) shows that firm output is a decreasing convex function of *managerial inefficiency*, here proxied by x_t^*. Those who enter entrepreneurship learn by "getting their feet wet" in the day-to-day operations of the business and simultaneously assessing their abilities (Bates 1990). Thus, as firms gain knowledge about industry costs and their particular level of inefficiency, they can improve their efficiency, survive and grow; otherwise, output stagnates and eventually declines, in which case the firm will exit the industry. Over time, surviving firms are able to reduce the variance of their managerial abilities; such knowledge leads to firm growth.

Impact of Independent Variables on Microenterprise Survival

First and foremost, Jovanovic's model of firm survival implies that the probability of failure of the household microenterprise will decrease as a function of time. This implication is central in the choice of estimation technique used in the quantitative

modeling and analysis to be presented in Chapters Five. Specifically, any parametric distribution applied to the data set should incorporate the improvements in the probability of survival that follow from Jovanovic's learning-by-doing model. In the absence of a parametric distribution which conforms to our theory of firm survival, nonparametric methods such as the Cox proportional hazards model provide a flexible approach in that no assumption need be made regarding the parametric distribution. (Further discussion of Cox's model is reserved for Chapter 5.)

Second, managerial efficiency -- indeed, entrepreneurial capacity -- is unobservable and thus a latent variable. However, observable variables can be identified which, provided they are highly correlated with managerial abilities, can be used in the measurement of firm survival. In this study, the age of the business owner will serve as a proxy for managerial efficiency, under the assumption that the owner's age reflects a period of continuous learning-by-doing and is thus highly correlated with managerial efficiency. Age was also used by Holtz-Eakin et al. (1994a and b), Bates (1990) and McDade (1993). Additionally, evidence of prior experience in a similar business activity can also be indicative of managerial efficiency. It is expected that both owner's age and prior experience will have a positive impact on the survival of the household microenterprise.

Third, formal education can also shed light on the level of managerial efficiency of the entrepreneur. Bates (1990) concluded that the level of formal education was a direct determinant in the ability to access credit and thereby relax the liquidity constraint on the enterprise. Empirical evidence also indicates that formal education--as an investment in

human capital--has a positive impact on personal income; in developing countries this impact is most notable for those who have completed primary school (Schultz 1975). It is expected that the level of formal education will have a direct relationship in the survival of the household microenterprise.

Fourth, the impact of geographical location (e.g., rural or urban) could take two forms *vis-a-vis* the survival of the household microenterprise. First, rural businesses serving relatively competitive urban markets could face significant transaction costs, primarily in transportation and marketing. These costs would tend to adversely impact the survival of such firms. However, rural firms organized to serve local markets would incur lower transaction costs, since their end markets are more accessible. As long as rural effective demand is sufficient, survival rates for these firms may indeed be higher than their urban counterparts. Thus, while the direction of the impact is uncertain, it is expected that geographical location will be significant in assessing the survival of the household microenterprise.

Fifth, gender matters in the allocation of time within the household (Downing 1990, Hopkins, Levin and Haddad 1994). In that a substantial proportion of microenterprises are founded and operated by women, the mere creation of the enterprise impacts time allocated to household production. Women perform most of the day-to-day tasks associated with the care, nutrition and general well-being of children and other members of the household. To the extent that they become involved in business activity, greater time productivity will be required if the same level of household production is to be realized, since time for business will necessarily displace time allotted to household

production. It is possible, however, that home-based market production will permit the woman to tend to both household production and market production. The quality of both tasks --in that time intensity will necessarily be sacrificed--then becomes an issue.

My hypothesis is that women *ceteris paribus* will not risk family capital without reasonable assurances of their entrepreneurial capacity to succeed at business. Their success may however depend on their ability to relax the liquidity constraint in their daily business operations. There is evidence that credit markets (both informal and formal) are biased against women in the credit allocation decision (Hossian 1988). This could place the female-run enterprise at greater risk of failure.

Sixth, cash flow is more important than profitability for the small firm. This is especially true for the capital-intensive enterprise with a relatively slow cash turnover. The ability to maintain operations with sufficient liquidity is paramount to enterprise survival. At the time of enterprise start-up, access to sufficient finance dictates whether needed plant and equipment can be purchased; continued operations are threatened if long-term finance is limited or unavailable to the enterprise. Mata and Portugal (1994) contend that both insufficient internal finance and imperfect capital markets force can force new firms to enter the market at a smaller scale than had external finance been accessible. Whether finance--when secured--is obtained through formal or informal sources may impact firm survival.

Seventh, labor costs form a substantial component of the variable costs of production for most enterprises. Household enterprises often make use of family labor, presumably as a means of reducing the wage bill. Perhaps more accurately, family labor

participation in the household microenterprise relaxes the liquidity constraint by postponing wage income to coincide with the firm's revenue stream.[4] In that the proportion of family labor in the enterprise improves the liquidity position, it should also have a positive impact on firm survival.

Finally, firm survival may be related to the type of enterprise undertaken. For example, manufacturing enterprises typically require larger up-front investment in plant and equipment than either service or retail enterprises. Cash turnover is potentially rapid in both service and retail, while in agriculture planting to harvest can involve a span of six months or more. Variations across sectors imply differences in the impact of the liquidity constraint as well. It is expected that both manufacturing and agricultural enterprises will exhibit higher hazard rates when compared to both service and retail enterprises.

Summary

In this chapter, I have extended agricultural household theory toward a theory of the household microenterprise. The HME evolves as an extension of household production under the perception of expected rents to household entrepreneurial capacity. Those households which take advantage of this opportunity initially reorganize their resources in an effort to meet effective demand in the marketplace. As these enterprises gain experience from learning-by-doing, some will survive and others will exit the marketplace; survival is argues to be affected by managerial efficiency, gender, liquidity, geographical location and economic sector. Chapter 5 develops an empirical model of firm survival, using data collected on existing and terminated Guyanese HMEs.

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[4] The point here is not whether the firm actually pays wages to its family members (indeed evidence from the survey indicates that many do not). Liquidity is enhanced if wages are foregone in the present and paid in the future as sales revenue accrues. In this sense, the family labor force counters the adverse impact of lumpy cash flows.

CHAPTER 5
FIRM SURVIVAL: AN APPLICATION OF DURATION ANALYSIS

Introduction

Until quite recently, the empirical analysis of firm survival tended toward the use of binary limited dependent variable models. In such models, the survival or failure of the firm is assessed at the time of data gathering and assigned to one of these two states of nature. Probit, logit or tobit analysis is then carried out, utilizing a set of covariates (roughly equivalent to regressors in the classical regression framework).

A major drawback of the binary approach is the limited, indeed truncated, information set with which the analysis is conducted. For example, consider the case of two enterprises from which data are gathered. The first enterprise--having begun operations the day before the survey was conducted--is assigned to the category of surviving or current enterprises. On the other extreme, the second firm--having commenced operations ten years ago--ended operations the same day the first enterprise began. The second firm is hence recorded as terminated. In neither case is account made of the *duration of firm survival*. It is here that duration analysis demonstrates an advantage over the binary models in that the entire time path of firm survival--indeed the life span of the enterprise--comprises the information set used in the analysis.

Engineers and designers have long been interested in duration analysis as a means of determining the failure rates of electronic components and various types of manufactured inputs. In the field of medicine, researchers have used duration analysis--in this case *survival analysis*--to assess patient treatment programs and survivor rates of transplant recipients. More recently, economists have applied these same techniques to strike duration, length of unemployment spells, and time until business failure (see for example, Kennan 1985).

In this chapter, an introduction to duration data analysis will be presented, with focus on econometric techniques associated with hazard modeling. The techniques will incorporate both nonparametric and nonparametric approaches to analyzing duration data. At first, our concern will be with assessing trends in the duration data without the inclusion of covariates; later, the modeling will be extended to include the impact of selected covariates on enterprise survival, utilizing the Cox proportional hazards model. A descriptive discussion of the data proceeds in Chapter 6. Results from the modeling proposed in this chapter are presented and discussed in Chapter 7.

A Primer on Duration Analysis

The variable of interest in duration analysis is the *length of time* that elapses from the beginning of some event (e.g., the creation of the household microenterprise) until it either ceases (i.e., fails) or the period of measurement ends.[1] It is possible that measurement of the length of survival may precede the failure of the enterprise, in which

[1] This section draws heavily from Kiefer (1988) and Greene (1993, pp. 715-727).

case *censoring* of data occurs. Conventional regression analysis using duration data can be further complicated by the time-varying nature of certain regressors (Kiefer 1988).

Duration analysis is concerned with the completion of some event or *spell*. In the present research, the spell in question is the length of survival of the household microenterprise. It would indeed be fortunate if the spells of all household enterprises exactly coincided with the date of our information gathering. Of course, this is not often the case and as such censoring is a pervasive and usually unavoidable problem in duration analysis. Specifically, household microenterprises in this sample will have either "completed their spells" (i.e., failed) or exhibit *right-censoring* (i.e., these enterprises were surviving at the time of data collection). Thus, duration analysis requires a method by which censoring can be accounted for within the quantitative modeling.

The terms *hazard* and *survival* are used extensively in duration analysis; each has a precise mathematical definition rooted in statistical theory (Kendall and Buckland 1982, Greene 1993). Suppose that the random variable T represents time and has a continuous probability distribution, $f(t)$, where t is the realization of T. The cumulative probability $F(t)$ is

$$F(t) = \int_0^t f(s)\, ds = Prob(T \leq t) \tag{5-1}$$

The *survivor function*, $S(t)$, is defined as,

$$S(t) = 1 - F(t) = Prob(T \geq t) \tag{5-2}$$

Survival is the complement of the cumulative function $F(t)$ (Kendall and Buckland 1982). The survivor function gives the probability of firm survival being *at least equal* to duration t. Building on this concept of survival, the next question is the following: what is the probability of completing the spell (i.e., firm failure) in some subsequent time interval, given that the spell lasted up to duration t? Let the next interval of time be defined as Δt. This question is answered by the *hazard function, $\lambda(t)$*, defined as,

$$\lambda(t) = \lim_{\Delta \to 0} \frac{F(t + \Delta t) - F(t)}{S(t)} = \frac{f(t)}{S(t)} \tag{5-3}$$

The hazard rate is a conditional probability reflecting the probability of failure after time t, given that the enterprise has survived at least until t. The relationship between the survivor function and the hazard function is given by,

$$\lambda(t) = \frac{-d \ln S(t)}{dt} \tag{5-4}$$

Where $\frac{d\,\lambda(t)}{dt} > 0$ at point t=t*, the hazard function is said to exhibit *positive duration dependence*, meaning that the hazard increases over time. Conversely, where $\frac{d\,\lambda(t)}{dt} < 0$, *negative duration dependence* is present and indicates that the hazard decreases over time. Another function useful in duration analysis is the *integrated hazard function, $\Lambda(t)$*. The integrated hazard function is defined as

$$\Lambda(t) = \int_0^t \lambda(u)\, du \,. \tag{5-5}$$

The relationship of the integrated hazard function to the survivor function is given by $S(t) = \exp[-\Lambda(t)]$.

Construction of a model for duration analysis can utilize nonparametric or parametric techniques. Nonparametric estimation does not place restrictions on the functional form of the model. Kaplan and Meier (1958, p. 459) state, "It seems reasonable to call an estimation procedure *nonparametric* when the class of admissible distributions from which the best-fitting one is to be chosen is the class of all distributions." In essence, nonparametric estimation "lets the data speak for itself."

The data may conform to some known parametric distribution, in which case it is convenient to assume a parametric distribution for the survivor, hazard and integrated hazard functions. Any parametric distribution is possible; however, the chosen parametric distribution should also conform to our stated theory of firm survival. Two of the most frequently used parametric distributions in duration analysis are the *exponential distribution* and the more general *Weibull distribution*.[2] The exponential distribution is characterized by a constant hazard rate over time while the Weibull distribution can exhibit an increasing, constant, or decreasing hazard rate over time.

The decision to follow nonparametric or parametric methods is based on (1) the fit of the data to any one of a number of parametric distributions and (2) the conformity of the chosen distribution to our economic theory of enterprise survival. A major element of the theory of firm survival discussed in the Chapter 4 is the *learning-by-doing* which occurs over the life span of the firm. Firms which are able to assess their relative performance in the industry and adapt accordingly will survive. Thus, one implication of

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[2] Other distributions which have be used in duration analysis include *log-normal, Gompertz, inverse Gaussian, generalized F, Gamma* and mixtures of these various distributions (Kiefer 1988).

the *learning-by-doing* hypothesis is that the hazard function should exhibit negative duration dependence, i.e., the probability of firm failure, given survival up to the present, should decrease as a function of time. Therefore, any parametric distribution chosen should produce a hazard function which exhibits negative duration dependence. Furthermore, it is expected that the data, when used to calculate nonparametric hazard rates, will exhibit negative duration dependence.

Nonparametric Estimation without Covariates

Enterprise duration can be used to construct functions which provide insight into the hazard and survival of the Guyanese microenterprise. Kiefer (1988) suggests a method first introduced by Kaplan and Meier (1958) for the nonparametric estimation of the hazard, integrated hazard and survivor functions. These functions are based on the starting and ending times for each microenterprise in the data set and are similar to the life tables constructed by Cox (1972). Kiefer extends the Kaplan and Meier methodology to account for censored observations. At this point, no attempt is made to relate length of completed spell (i.e. duration of the enterprise) with a set of covariates in a regression-like format; our only concern is to shed light on any trends reflected in the hazard and survival rates for these microenterprises.

Each observation in the data set denotes a household microenterprise for which starting and ending dates are given. For purposes of analysis, define *survival spell* as the period of household microenterprise survival.[3] The year in which the enterprise began

[3] Throughout the text, *spell* and *duration* will refer to the span of time between start-up of the enterprise and termination of the enterprise.

operations denotes the start of its survival spell. Spell completion is a function of the censored or uncensored nature of each observation. In the case of terminated enterprises, spell completion is the year in which the enterprise ceased operations. For existing businesses, the year of spell completion is censored at the time of the survey. Calculation of the nonparametric estimates entails ordering the observations according to the spell duration--from shortest duration to longest duration-- then using the number of household enterprises pertaining to each distinct spell in determining the hazard function. The estimated hazard function is then used to obtain both the survivor and integrated hazard function.

Let h_j equal the number of household enterprises with survival spells of duration t_j. The number of incomplete or uncensored spells before duration t_j is denoted by n_j. An estimator for the hazard function $\lambda(t_j)$, is thus given by

$$\hat{\lambda}(t_j) = \frac{h_j}{n_j} \tag{5-6}$$

and denotes the number of failures at duration t_j divided by the number of household enterprises "in the risk set" at duration t_j (Kiefer 1988). The risk set consists of those enterprises at risk of failure at time t. The survivor function is given by

$$\hat{S}(t_j) = \prod_{i=1}^{j} (1 - \hat{\lambda}_i) \tag{5-7}$$

This estimator is obtained by setting the estimated conditional probability of completing a spell at t_j equal to the observed relative frequency of completion at t_j. A related function--the integrated hazard--can be estimated using the following formula,

$$\hat{\Lambda}(t_j) = \sum_{i \leq j} \hat{\lambda}(t_i) \ . \tag{5-8}$$

Nonparametric estimation of hazard, survivor and integrated hazard functions based on the Guyana data set are presented and discussed in Chapter 7.

Parametric Estimation Without Covariates

As discussed earlier, the *learning-by-doing* hypothesis of firm survival implies a decreasing hazard rate over time. It would therefore be useful to test this hypothesis empirically by evaluating the fit of our data to a variety of parametric distributions which may conform or conflict with the hypothesis. By identifying a suitable parametric distribution, more efficient estimators are obtained and computation is more tractable; however, an incorrect parametric choice can result in unreliable and unstable estimates (Heckman and Singer 1984). If the data are shown to conform to a known parametric distribution, calculation of hazard, survivor and integrated hazard functions is reduced to the use of standard formulas. In this section, a model for parametric estimation is detailed.

The one-parameter *exponential distribution* is chosen under the null hypothesis that the data exhibit a constant hazard rate. The hypothesis is then relaxed through parametric estimation utilizing the more general two-parameter *Weibull distribution*. These distributions are widely used in economic duration analysis and provide a starting point for undertaking parametric estimation with our data. Table 5-1 presents the

functional forms relevant to duration analysis for the exponential and Weibull distribution. Note that the one-parameter exponential distribution is simply a special case of the Weibull distribution in which $\alpha=1$. Results for these parametric estimations are presented and discussed in Chapter 7.

Table 5-1: Functions for Duration Analysis: Exponential and Weibull distributions

FUNCTION	EXPONENTIAL DISTRIBUTION	WEIBULL DISTRIBUTION
Density	$f(t) = \theta\exp(-\theta t)$	$f(t) = \theta\alpha t^{\alpha-1}\exp(-\theta t^{\alpha})$
Cum. Density	$F(t) = 1 - \exp(-\theta t)$	$F(t) = 1-\exp(-\theta t^{\alpha})$
Survivor	$S(t) = \exp(-\theta t)$	$S(t) = \exp(-\theta t^{\alpha})$
Hazard	$\lambda(t) = \theta$	$\lambda(t) = \theta\alpha t^{\alpha-1}$
Integrated Hazard	$\Lambda(t) = \theta t$	$\Lambda(t) = \theta t^{\alpha}$

Source: Kiefer (1988, pp. 652-54)

Let the joint density function be defined as follows:

$$L(\theta) = f(x_1, x_2,\ldots,x_n; \theta) . \tag{5-9}$$

The exponential distribution, as a one-parameter distribution, has a likelihood function of the general form:

$$L(\theta) = \prod_{i=1}^{n} f(x_i;\theta) . \tag{5-10}$$

Next, using notation from Freund and Walpole (1980, p. 329), derive the likelihood function for the exponential distribution,

$$L(\theta) = (\frac{1}{\theta})^n * e^{-(\frac{1}{\theta})*\sum_{i=1}^{n} x_i} \quad (5\text{-}11)$$

and form the *log likelihood* function, $lnL(\theta)$:

$$lnL(\theta) = -n \ln \theta - \frac{1}{\theta}\sum_{i=1}^{n} x_i \ . \quad (5\text{-}12)$$

We then maximize $lnL(\theta)$ and obtain the following first order condition:

$$\frac{\partial lnL(\theta)}{\partial \theta} = -\frac{n}{\theta} + \frac{1}{\theta^2}\sum_{i=1}^{n} x_i = 0 \ . \quad (5\text{-}13)$$

Solving for θ, we obtain $\hat{\theta}_{MLE} = \bar{x}$. For the exponential distribution, the maximum likelihood estimator for θ is simply the mean spell duration of firm survival. This method assumes no censored observations, which is not valid for the Guyana data; 80 percent of the observations were censored.

Kiefer (1988) suggests a method to handle such censored observations. Let $d_k = 1$ if the k^{th} spell is uncensored and $d_k = 0$ otherwise. Again, form the likelihood function $L(\theta)$:

$$lnL(\theta) = \sum_{i=1}^{n} d_i \ lnf(t_i;\ \theta) + \sum_{i=1}^{n} (1-d_i)\ lnS(t_i;\ \theta) \quad (5\text{-}14)$$

where $f(\cdot)$ denotes the density function and $S(\cdot)$ represents the survivor function. From

Kiefer (1988) we know that for the exponential distribution,

$$f(t_i;\ \theta) = \theta\exp(-\theta t)\ ,$$
$$S(t_i;\ \theta) = \exp(-\theta t)\ . \tag{5-15}$$

Substituting, we obtain:

$$lnL(\theta) = \sum_{i=1}^{n} d_i \ln[\theta\exp(-\theta t)] + \sum_{i=1}^{n} (1-d_i)\ln[\exp(-\theta t)] \tag{5-16}$$

which reduces to

$$\ln L(\theta) = \sum_{i=1}^{n} d_i \ln\theta - \theta\sum_{i=1}^{n} t_i\ . \tag{5-17}$$

Maximizing $lnL(\theta)$ and solving the first order conditions yields

$$\hat{\theta}_{MLE} = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} t_i}\ . \tag{5-18}$$

This value for $\hat{\theta}_{MLE}$ can then be used to calculate and graph the estimated hazard, survivor, and integrated hazard functions under the assumption of an exponential parametric distribution.

The procedure to account for censoring of the data is more complex with regard to the Weibull distribution. The likelihood function will take on the form

$$\ln L(\theta,\alpha) = \sum_{i=1}^{n} d_i \ln\theta + \sum_{i=1}^{n} d_i \ln\alpha + (\alpha-1)\sum_{i=1}^{n} d_i \ln t_i - \theta\sum_{i=1}^{n} t_i^{\alpha} \qquad (5\text{-}19)$$

where $d_i = 1$ if the i^{th} spell is uncensored and $d_i = 0$ otherwise. Maximization of $lnL(\theta,\alpha)$ is performed using the LIMDEP software package. Results of parametric estimation are presented and discussed in Chapter 7.

The Proportional Hazards Model

Cox (1972) developed a general nonparametric model that serves to analyze the impact of a set of explanatory variables--covariates--on the hazard of the household microenterprise.[4] Early application of the Cox model was almost exclusively in the field of medical research in which patient survival times were assessed in relation to individual characteristics of each patient. For our purposes, the hazard in question is the failure of the household microenterprise and the covariates are those introduced in Chapter 4 (e.g., owner age, gender, economic sector, liquidity, etc.). Cox suggests the following model:

$$\lambda(t,\ x,\ \beta,\ \lambda_0) = \phi(x,\ \beta)\lambda_0(t) \qquad (5\text{-}20)$$

where the hazard function $\lambda(\cdot)$ depends on a vector of explanatory variables x with coefficients β and $\lambda_0(t)$ denotes the *baseline hazard*. Estimation is considered nonparametric in that no parametric distribution is specified for the baseline hazard. It is customary to parameterize $\phi(x,\ \beta)$ in log-linear form, in which case $\phi(x,\ \beta) = \exp(x'\beta)$

[4] Kalbfleisch and Prentice (1980) and Kiefer (1988) both present excellent expositions of the proportional hazards model.

(Cox and Oakes, 1984, Han and Hausman 1990). Our model thus becomes,

$$\lambda_i(t) = \exp(\beta' x)\ \lambda_0(t)\ . \tag{5-21}$$

The concept underlying eq. (5-21) is that the individual hazard λ_i differs from the baseline hazard by a constant, scalar factor. By assuming an identical baseline hazard function for all individual household microenterprises, the focus shifts to estimation of the specific β coefficients. Dividing both sides of eq. (5-21) by $\lambda_0(t)$ and performing a log transformation, we obtain,

$$\ln\left[\frac{\lambda_i(t)}{\lambda_0(t)}\right] = \beta' x\ . \tag{5-22}$$

Kiefer (1988) follows Cox (1972) by suggesting a *partial likelihood* approach to estimate the β-vector in eq. (5-22) without specifying the form of the baseline hazard function. Let the completed spells be ordered such that $t_1 < t_2 < \ldots < t_n$ (at this point, we ignore censoring and ties). The conditional probability that observation 1 completes its spell at duration t_1, given that any of the n observations could have been completed at duration t_1, is

$$\frac{\lambda(t_1, x_1, \beta)}{\sum_{i=1}^{n} \lambda(t_1, x_i, \beta)}\ . \tag{5-23}$$

Using eq. (5-20), (5-23) becomes

$$\frac{\phi(x_1, \beta)}{\sum_{i=1}^{n} \phi(x_i, \beta)} \tag{5-24}$$

and this quantity is the contribution of the shortest duration observed to the partial likelihood (Kiefer 1988, p. 668). Similarly, the contribution of the jth shortest duration is

$$\frac{\phi(x_j, \beta)}{\sum_{i=j}^{n} \phi(x_j, \beta)} \tag{5-25}$$

In each case, the contribution to likelihood is the ratio of the hazard for the individual household enterprise completing a spell at duration t divided by the sum of the hazards of all household enterprises with spells still in progress just prior to time t. The likelihood is formed as the product of the individual contributions. Remembering the log-linear parameterization of the scalar, the log-likelihood function is given by

$$L(\beta) = \sum_{i=1}^{n} \{(x_i, \beta) - \ln[\sum_{j=i}^{n} \exp(x_j, \beta)]\} . \tag{5-26}$$

As Kiefer (1988, p. 668) states, " the intuition [in eq. (5-26)] is that, in the absence of all information about the baseline hazard, only the order of the durations provides information about the unknown coefficients."

Censoring is pervasive in our data and is conveniently handled in the partial-likelihood technique. A household enterprise for which the spell is censored between t_j

and t_{j+1} appears in the summation in the denominator of the contribution to log-likelihood of (ordered, uncensored) observations 1 through j, but not in any others. Censored spells do not enter the numerator of a contribution to likelihood at all (Kiefer 1988). Ties in the data can be handled by including a contribution to likelihood for each of the tied observations, using the same denominator for each.

As Kalbfleisch and Prentice (1980) point out, the partial likelihood approach is not a likelihood in the standard sense in that it does not yield a result which is proportional to the conditional or marginal probability of any observed event. However, Cox has shown that the method gives maximum "partial" likelihood estimates that are consistent and asymptotically normally distributed with asymptotic covariance matrix estimated consistently by the inverse of the matrix of second partial derivatives of the log-likelihood function (Kalbfleisch and Prentice 1980, Cox and Oakes 1984). Results for the proportional hazards model are presented in Chapter 7.

Summary

In this chapter, I have offered a review of duration analysis in the context of building an empirical model of the hazard of the household microenterprise. Hazard was presented in a statistical context and defined as the conditional probability of "completing the spell" at time $t + \Delta t$ (i.e., failure of the household microenterprise), given that the enterprise had survived up to time t. Using the cumulative and density distribution functions, a family of duration functions--hazard, survivor and integrated hazard--can then be estimated. The duration functions can be estimated without assuming a particular parameterization on the data set (nonparametric estimation) or by imposing a parametric

family on the duration data (parametric estimation); furthermore, a set of covariates can be incorporated into the estimation to assess their impact on hazard. Theory can inform the empirical model building as to those specific parametric family of interest in the modeling of the hazard of the household microenterprise; here, the exponential and Weibull parametric families are presented. The Cox proportional hazards model was introduced as a nonparametric approach to modeling the hazard of the household microenterprise against a set of covariates.

CHAPTER 6
THE DATA

The data collection exercise for this research took place over a two month period beginning October 1996. A total of twenty-three individuals took part in the data collection. The following is a systematic account of the methodology employed in the data gathering.

Survey Construction and Sample Design

The particular nature of the microenterprise sector in Guyana posed a challenge for the design of the survey research. First, no universal lists exist for the purposes of drawing a sample from the known population of microenterprises. This is not unique to Guyana; it is common for microenterprises in developing countries to form part of the so-called "informal sector" which typically lies beyond the regulatory control of the public sector. It would have been possible to draw a survey sample from those organizations assisting microenterprises (e.g., IPED, ScotiaEnterprise, CD, Int'l); however, such a sample would suffer from selection bias and would be censored in favor of currently operating enterprises. Such sampling would only consist of a select group of enterprises which sought and received assistance and therefore would lack both explanatory power and generalizability to the larger population of microenterprises. Second, the geography of Guyana, combined with the limited physical infrastructure, make a truly country-wide

survey both financially impractical and logistically improbable. Third, the limited time-frame for the data gathering exercise (two months), as well as the finite budget constraint, limited the coverage area of the survey and the number of assistants who could be contracted to aid in data collection.

It was therefore necessary to construct the sample from some identifiable population, preferably a population highly correlated with microenterprise activity. Since the stated objective was to obtain data on Guyanese microenterprises, and the theoretical framework hypothesized a household--enterprise linkage, it was decided to test this linkage empirically by way of the survey design. While universal lists of microenterprises were not available, census data on Guyanese households were available and accessible from the Statistics Bureau of the Government of Guyana. Guyana is divided into ten administrative regions; each region is further divided into *enumeration districts*. Enumeration districts were randomly selected to obtain the sample for the survey. Accurate maps of each enumeration district were obtained from the Statistics Bureau, Government of Guyana. Table 6-1 gives population and enumeration districts for each administrative region.

Prior to this exercise, no data base had been generated on the microenterprise sector in Guyana. It was therefore both desirable and important to gather as much baseline data as possible on both qualitative and quantitative elements of the Guyanese microenterprise. For these reasons, it was decided to administer a survey to a random sample of Guyanese households. Both current and terminated enterprises would be surveyed.

The demographics of Guyana are such that approximately 90 percent of the population inhabits roughly ten percent of the territory (see map, Appendix A). This ten percent is located along the north coast of the country in a forty mile band. Thus, the survey design focused on the administrative regions within this forty mile band, namely regions one through six and region ten (Table 6-1). Together, these administrative regions accounts for 2,194 enumeration districts with a combined population of 677,740 (95 percent of the total population).

Table 6-1: Population Statistics, Regions 1-10, Cooperative Republic of Guyana

Region	Enumeration Districts (total)	Population		Total Population
		Male	Female	
1	69	9,520	8,774	18,294
2	186	21,080	22,059	43,139
3	347	47,432	47,844	95,276
4	830	141,333	153,161	294,494
5	226	25,545	25,729	51,274
6	408	70,231	71,224	141,455
7	61	7,916	6,766	14,682
8	23	2,962	2,612	5,574
9	53	7,645	7,302	14,947
10	128	16,432	17,376	33,808
TOTAL	2,331	350,096	362,847	712,943

Source: Bureau of Statistics, Government of Guyana

A eleven-page survey was used as the primary data gathering tool for the research (see Appendix C). Section I of the survey obtained a general background of the business. Care was taken by the interviewers to detail the circumstances leading to the creation of each business and its current status. Section II sought explicit data on (1) assets, (2) liabilities, (3) equity, and (4) income and expenses. Data were also obtained concerning start-up capital and working capital for each microenterprise. Section III documented

savings behavior among those sampled to determine the potential for savings mobilization from microenterprises. Questions were also constructed to permit self-appraisal by business owners: they were asked to define success and whether they indeed were successful according to their own definition. Data on age, gender, and educational level of the owner, as well as household size and monthly household income, were recorded in Section IV. For ease of coding, most questions were of the *closed* variety, requiring the choice of a single response among a specified set of alternatives. To permit comparison of results among current and terminated businesses, identical questions were administered to both current and terminated enterprises.

From these enumeration districts, a random sample was drawn in the following manner. Each of the enumeration districts was assigned an equal probability of being selected for the sample. Equal weight was also assigned to rural and urban districts; in other words, no stratification of the population was made prior to extracting the sample. Operationally, the sample was constructed by (1) generating a list of numbers from 1 to 2,194 (i.e., the total number of enumeration districts) and (2) randomly selecting twenty enumeration districts from the list.[1] Table 6-2 provides relevant statistics on the twenty enumeration districts which comprised the survey sample for the research.

At the time of the sample construction, enumerators were also hired to assist in the data collection. In all, seventeen enumerators, most of whom were university undergraduates, took part in the data collection. The enumerators took part in a three-day

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[1] It was determined that up to twenty enumeration districts could be successfully surveyed given the time and budgetary constraints of the project.

training workshop during which the research objectives were reviewed and the survey instrument itself was thoroughly discussed. During the workshop, the enumerators field tested the survey in selected areas of the Greater Georgetown area to detect any problems with the wording of the questions. This was important given that, while English is the language of Guyana, nuances and colloquial expressions must be considered in the proper wording of questions in order to minimize errors in measurement. Also, the field test served to acquaint the enumerators with the field work aspect of data collection.

To aid in the supervision of the enumerators during actual data collection, three field supervisors were also recruited to assist in management of the research. Each supervisor had extensive field experience in data collection; together, the three supervisors had approximately eight years of work experience with the Statistics Bureau, Government of Guyana. These field supervisors also facilitated the logistics of collecting the data and maintained accurate maps of each sampled enumeration district.

As can be seen from the population statistics in Table 6-2, some enumeration districts have small total populations (e.g., Bushy Park, Free and Easy, Lewis Manor, Ostend). In order to maximize the returns to field data collection, the survey design was modified to permit the "clustering" of low population enumeration districts. *Clustering* entailed the inclusion of those enumeration districts bordering the sample district until a sufficient number of households were included into the sample.

Table 6-2: Sampled Enumeration Districts, population by district and gender

Enumeration District	Region	Population		Total Population
		Male	Female	
Agricola Village	4	245	270	515
Annandale	2	82	92	174
Bel Air Spring/ Bel Air	4	172	205	377
Bourda	4	137	156	293
Bushy Park	5	3	6	9
Campbellville	4	122	112	234
Cockatara (N. McKenzie)	10	133	147	280
Free and Easy	3	25	27	52
Fyrish	6	204	187	391
Good Success	4	309	356	665
Lewis Manor	6	32	28	60
No. 0	6	200	196	396
Ostend	3	28	25	53
Plaisance	4	207	206	413
Siberien, Dorabisi	10	69	54	123
Union	5	138	142	280
Viva La Force	3	111	89	200
Waramuri Mission	1	221	204	425
Water Front Housing Scheme	4	102	106	208
Zeeburg	3	117	96	213
TOTALS:		2,657	2,704	5,361

Source: Statistics Bureau, Government of Guyana

Figures 6-1 and 6-2 give comparisons for the sample and population densities. As expected, the sample closely reflects the demographic densities of the total population of

Guyana. Sixty percent of the total sample came from administrative regions three and four; these are also the most heavily populated regions in Guyana.

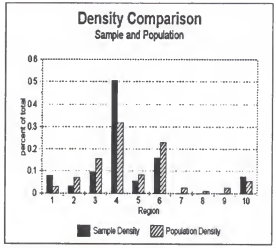

Figure 6-1

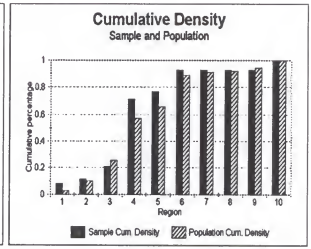

Figure 6-2

A total of 1,977 households were contacted during the data collection period.[2] Of this total, 471 were not at home when the surveying was conducted, resulting in a total response rate of seventy-six percent (1,506 households). Of these responding households, 769 (51 percent) had neither a current nor a previous business while 59 households (4 percent) refused to participate in the survey. Thus, 680 households completed the survey, of which 542 (80 percent) currently

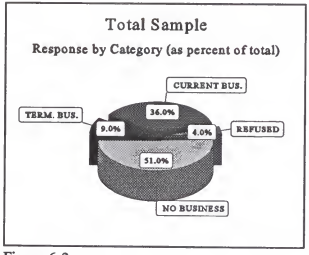

Figure 6-3

[2] Two of the twenty enumeration districts--Waramuri Mission and Annandale--were not surveyed due to budget and time considerations.

operate a business and 138 (20 percent) has previously owned or operated a terminated business. Figure 6-3 breaks down sample response by category. Table 6-3 presents the total completed surveys, by type and enumeration district.[3]

Limitations of the Data

While generalizations will be drawn from the data gathered in this research, the following caveats apply. First, it is assumed that each respondent was asked the same set of questions under identical conditions. Any *interviewer bias* would of course weaken this assumption.[4] The research assistants took part in a three-day training workshop, during which they studied the nature of the research and its methodology, and the manner in which data was to be gathered. This was expected to minimize potential interviewer bias. Second, some level of *non-sampling or response bias* (e.g. under reporting of income, giving false or inaccurate information) is inevitable.[5] This research analyzes the collected data "at face value" and will make note of any anomalies as they are discovered. Third, ambiguity of survey questions and the information they are designed to elicit can imply errors in measurement. Efforts to minimize such errors were made via the pre-testing of the questionnaire and once again prior to actual sampling. Finally, an overall low response

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[3] In referring to businesses which are ongoing, the terms *existing* and *current* are used interchangeably throughout this discussion.

[4] In surveys of human populations by interview, interviewer bias denotes bias in the responses or recorded information which is the direct result of the action of the interviewer. This bias may be due to (1) failure to contact the right person or (2) failure of the interviewer to establish proper relations with the informant, the result being imperfect or inaccurate information being offered. (Kendall and Buckland 1982, p. 98).

[5] Non-sampling error may occur due to defects in the sampling frame, faulty demarcation of the sampling units, defects in the selection of sample units, mistakes in the collection of data due to personal variations or misunderstandings on the part of the investigator or the interviewee, etc. (Kendall and Buckland 1982, p. 138).

rate can introduce bias in the sample, cast doubts on the research methods used, and diminish efforts to generalize results. Callbacks were made to those households which were initially unavailable to improve the overall response rates. Also, surveys were conducted at varying times of the day, which helped to obtain an acceptable response rate.

Table 6-3: Sample Composition by Enumeration District

Enumeration District	Current Business	Terminated Business	Total completed surveys
Agricola	34	9	43
Bel Air	40	6	46
Bourda	34	6	40
Bushy Park	30	7	37
Campbellville	33	3	36
Cockatara/ N. McKenzie	37	7	44
Free and Easy	14	0	14
Fyrish	21	4	25
Good Success	31	10	41
Lewis Manor	28	10	38
No. 0	25	11	36
Ostend	35	4	39
Plaisance	30	12	42
Siberien/ Dorabisi	25	14	39
Union	38	9	47
Vive La Force	21	11	32
Waterfront Housing Scheme	27	10	37
Zeeburg	39	5	44
TOTALS	542	138	680

Descriptive Analysis of Survey Sample

Households were targeted in the survey design to exploit the hypothesized linkage between the household and the microenterprise. The sample lends support to the

existence of such a linkage; ninety-eight percent of existing sampled enterprises can be classified as microenterprises based on total labor force participation (i.e. ten employees or fewer). Among the terminated businesses, one hundred percent can be classified as microenterprises based on total labor force participation. For both existing and terminated businesses, forty-four percent are one employee firms; ninety-two percent of the total sampled enterprises have total employment (i.e., full- and part-time workers) of five or less (Tables 6-4a and 6-4b). Among current businesses, family labor accounted for 50 percent of full-time employment, again supportive of the household linkage to

Table 6-4a: Labor Force Participation: Total Sample

	Number of Full and Part-time Employees				
	One	Two to Five	Six to Ten	> 10	TOTAL
Current (n/r=10)	224	267	31	10	532
Terminated (n/r=5)	64	60	9	0	133
TOTAL SAMPLE (n/r=15)	288	327	40	10	665

n/r: non-response

Table 6-4b: Summary Statistics, Total Labor Force Participation: Current Enterprises

Total labor force participation by sector	mean	standard deviation	median	mode	max	min
Agriculture	3.42	2.97	2	2	18	1
Manufacturing	2.37	1.62	2	1	8	1
Retail	1.88	1.39	1	1	11	1
Services	2.92	5.43	2	1	55	1

microenterprises; for terminated businesses, sixty-seven percent of total employment was drawn from family members. These findings imply that the chosen research design

effectively reached the microenterprise sector. As such, generalizations to the population of microenterprises can be made with a sufficient level of confidence.

The data indicate that these microenterprises occupy a sizable portion of household time. More than 90 percent of enterprises operate at least five days per week; most of the enterprises are year-round operations (Table 6-5). The microenterprise is thus a principal component in the lives of these households.

Table 6-5 : Number of days and months worked: Total Sample

# days worked	# enterprises		# months worked	# enterprises
1	7		1	2
2	10		2	8
3	26		3	6
4	13		4	9
5	56		5	7
6	150		6	8
7	407		7	3
			8	5
			9	6
			10	7
			11	15
			12	597

With respect to the total sample (Fig. 6-4), there were 182 agricultural enterprises (27 percent); 63 manufacturing enterprises (9 percent) , 289 retail establishments (43 percent), and 146 service businesses (21 percent). By way of comparison, value-added in

agriculture, manufacturing and services accounted for 27.6 percent, 34.4 percent and 38.0 percent, respectively, in the latest data on Guyanese Gross Domestic Product (World Bank 1995). The present sample indicated that manufacturing enterprises are under represented in the microenterprise sector; simultaneously, there was a slight over representation of service-related enterprises.

The composition of the sample indicated high microenterprise participation in retail activities (Fig. 6-4). Combined with the observed under representation of manufacturing enterprises -- which are typically more capital intensive -- it seems probable that finance and liquidity considerations may be a factor in the type of business chosen by the entrepreneur. Inability to finance businesses with large start-up costs (e.g., manufacturing) could be funneling entrepreneurs into retail enterprises which can be financed at a level commensurate with available personal funds.

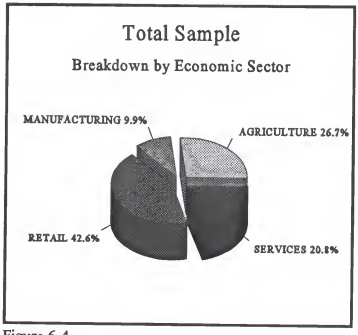

Figure 6-4

Among the current enterprises, the sectoral breakdown among agriculture, manufacturing, retail and services was 27 percent, 9 percent, 41 percent and 23 percent, respectively. Terminated enterprises sampled showed similar sectoral breakdowns; the retail sector

dominated (48 percent of total firms), followed by agriculture (26 percent), services (15 percent) and manufacturing (11 percent).

The Owner/Operator of the Household Microenterprise

Forty-five percent of all businesses surveyed (296 total) were owned by males, forty-seven percent were female-owned (305 total) and another eight percent were jointly owned, most often by spouses (Table 6-6). Males operated 245 current businesses (47 percent) while women operators accounted for 226 (43 percent) of the remaining current firms; another 71 current businesses (10 percent) were jointly run, usually by spouses. Among the current enterprises, women tended to operate retail businesses; males tended toward agricultural firms. Female ownership accounted for 61 percent of the terminated enterprises sampled.

Table 6-6: Ownership of Microenterprise by Gender, Total Sample

	Ag.	Manu.	Retail	Services	TOTALS
Male	112	30	71	83	296
Female	47	28	178	52	305
Both	22	2	24	3	51
TOTALS	181	60	273	138	652

Fifty-three percent of current business owners had completed primary school; an additional thirty-three percent had completed secondary school (Table 6-7). The proportion of the sample having no formal schooling was relatively small for both current and terminated enterprises. This may reflect the Guyanese tradition of emphasis on education. However, microenterprise activity drops off decidedly for those who have completed secondary education and university. The data appear to support an inverse relationship between educational level and participation in microenterprise.

Table 6-7: Formal Education of Owners, Current and Terminated Enterprises

Formal Education Completed	Current				Terminated			
	Male	Female	Joint		Male	Female	Joint	
			Male	Female			Male	Female
No School	16	12	7	6	5	3	0	2
Primary	119	134	43	38	28	47	9	8
Secondary	80	79	23	32	14	21	4	4
University	7	2	5	2	2	0	1	0
Totals	222	227	78	78	49	71	14	14

Table 6-8a: Age of Owner by Sector: Current Microenterprises

age of owner by	mean	std. error	median	mode	max	min
agriculture (n=148)	43.9	1.1	42.0	48.0	82.0	22.0
manufacturing (n=46)	41.3	2.1	37.5	33.0	71.0	17.0
retail (n=214)	39.5	0.9	37.0	35.0	77.0	15.0
services (n=124)	37.7	1.1	35.0	34.0	77.0	16.0
Total (n=533)	40.6	0.6	38.0	34.0	88.0	15.0

Table 6-8b: Age of Owner by Sector: Terminated Microenterprises

age of owner by	mean	std. error	median	mode	max	min
agriculture (n=36)	47.1	2.6	48.0	30.0	78.0	27.0
manufacturing (n=13)	40.7	3.6	36.0	34.0	69.0	16.0
retail (n=64)	40.0	1.6	38.0	35.0	77.0	21.0
services (n=21)	39.9	3.6	37.0	26.0	86.0	21.0
Total (n=134)	41.9	1.2	38.0	35.0	86.0	16.0

The average age for owners of current microenterprises was 40.6 years and 41.9 years for terminated microenterprises (Tables 6-8a and 6-8b). Owners of current agricultural enterprises were somewhat older than the rest of the current enterprises. It was somewhat striking that all measures of central tendency (i.e., mean, median and mode) indicate less than proportional representation on the part of youth and young adults in microenterprise.

The sample was uniform with respect to household size. Mean household size was five members for both current and terminated enterprises. Slightly less than 90 percent of all households had eight members or less (Table 6-9). Additional information provided during the interviews suggested that it was fairly common for more than one household to share a dwelling.[6]

Table 6-9: Household Size, Current and Terminated Enterprises (total # of individuals)

Type of Enterprise	Mean	Std. Dev.	Median	Mode	Max.	Min.
Current (n=524)	5.3	2.6	5	5	18	1
Terminated (n=133)	5.2	2.5	5	4	14	1

Data were also collected concerning average total monthly income for the household. Per-capita annual income in Guyana for 1995 was approximately G$ 84,000 (US$ 600), which translates into G$ 7,000 (US$ 50) per month. Household income for the survey was measured in increments of G$ 10,000 (US$ 71) and was right-censored at

[6] Enumerators attempted to ascertain multiple households by asking whether everyone "ate from the same pot", in that cooking arrangements are distinct for separate households.

incomes greater than G$ 70,000 (US$ 500). The combined sample showed a median monthly household income in the range G$ 20,000 to G$ 30,000 (US$ 142 to US$ 214). Forty-five percent of current enterprises and 58 percent of terminated enterprises indicated an average monthly income of G$ 20,000 (US$ 142) or less.

Overall, 71 percent of the sample came from rural respondents, with the remaining 29 percent representing urban establishments (Table 6-10). There appeared to be some association between geographical location and survival. Rural enterprises accounted for 82 percent of terminated enterprises; for the existing enterprises, 69 percent were rural.

Table 6-10: Sample by Rural/ Urban Location

Current Businesses:				Terminated Businesses:				All Businesses:			
Sector	Rural	Urban	Total	Sector	Rural	Urban	Total	Sector	Rural	Urban	Total
Ag.	134	14	148	Ag.	33	3	36	Ag.	167	17	184
Manu.	35	13	48	Manu.	12	3	15	Manu.	47	16	63
Retail	159	60	219	Retail	56	10	66	Retail	215	70	285
Services	44	83	127	Services	12	9	21	Services	56	92	148
TOTAL	372	170	542	TOTAL	113	25	138	TOTAL	485	195	680

The Household Microenterprise

The dates of start-up and closure of each enterprise were also recorded. For existing enterprises the date of closure is right-censored at the time of data collection. Mean duration of survival for current enterprises was 8.4 years; for terminated enterprises, the mean is 6.8 years. In both cases, enterprise duration is heavily skewed to the left and supportive of negative duration dependence among the sample (Table 6-11). One-half of current businesses (270 total) had been in operation for four years or less; of these, 155 firms (30 percent of total) had been started within the last year.

Table 6-11: Duration of Enterprises (in years): Total Sample

	Mean	Std. Error	Skewness	Median	Mode	Max.	Min.
Current (n=514)	8.4	0.5	2.8	4	1	76	1
Terminated (n=137)	6.9	0.6	2.2	5	2	41	1

Forty percent of the terminated businesses had started during the period 1991 to 1995; another thirty-nine percent had started between 1980 and 1990. Median survival time for the pool of terminated businesses was four years. Two-thirds of these businesses survived five years or less; thirty percent survived one year or less. When asked how they had terminated the business, twelve percent (16 firms) responded that the business was sold by the owner and eighty-six percent (119 firms) stated that they went out of business. Common reasons given for going out of business were the following: (1) insufficient finance, (2) too many producers of the product or service, (3) low demand for product or service, (4) personal decision to leave business, (5) retirement due to old age, and (6) relocation of family.

Each business reported its monthly income and expenses; from these data net income was calculated. Mean monthly net income for current businesses was G$87,731.82 (US$ 626.66) (Table 6-12). Both the median and the mode are well below the mean and indicate a net income distribution which is highly skewed to the right. For terminated enterprises, the mean net income of G$ 21,790 (US$ 155.64) is well about one-fourth of current enterprises; median and mode values for terminated enterprises are similar to those of existing enterprises and also indicate a net income distribution skewed to the right.

Table 6-12: Net Monthly Income (G$)

Type of Enterprise	Mean	Std. Error	Median	Mode	Max.	Min.
Current	87,731.82	36,655.18	8,600.00	16,000.00	14,000,000.00	(800,000.00)
Terminated	21,790.26	5,187.80	8,000.00	8,000.00	460,000.00	(36,000.00)

Recall that the median monthly household income for both existing and terminated enterprises was in the range of G$ 20,000 to G$ 30,000. Thus, for this sample, the microenterprise appears to generate a sizable portion of monthly household income. This is further supported by the data obtained on days of the week and months of the year during which the business operates. Ninety percent of the firms operated at least five days per week; eighty-eight percent functioned twelve months of the year (Fig. 6-5, Fig. 6-6).

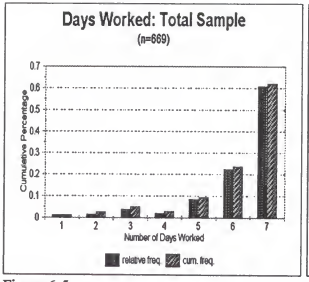

Figure 6-5

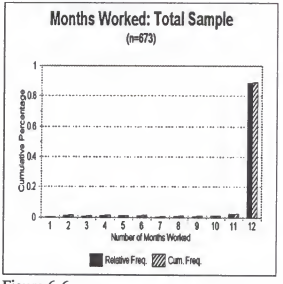

Figure 6-6

On the issue of business start-up, each respondent was asked whether they actually began the business. Self-starters may be more entrepreneurial relative to non-starters;

depending on the circumstances which led to creation of the business, such starters may be more likely to survive in business than non-starters. Just over three-fourths of current businesses were started by their current owner (Table 6-13). Men and women were equally represented among business starters. Over 80 percent of terminated businesses were started by the respondent; of these, roughly two-thirds were started by women and these businesses were primarily retail in nature.

Table 6-13: Business Starters by Economic Sector and Gender
(Figures are percent of total)

Current Businesses					
	Agriculture	Manufacturing	Retail	Services	TOTALS
Male	16	5	9	14	44
Female	6	3	26	9	44
Both	3	0	7	1	11
TOTALS	25	8	42	24	99
Terminated Businesses					
	Agriculture	Manufacturing	Retail	Services	TOTALS
Male	17	4	8	8	37
Female	10	7	39	7	63
TOTALS	27	11	47	15	100

Operators of existing enterprises were asked to categorize the current growth status of their business (question A11, Appendix C). Strong growth was reported for 61 firms (11 percent) while slow or no growth was chosen by 400 firms (74 percent). At the other extreme, few firms felt their businesses were declining; only 14 percent of current businesses reported sales declines or the possibility of closing down. Across each of the

four economic sectors, approximately 50 percent of current business respondents rated their firms in the slow growth category (Fig. 6-7).

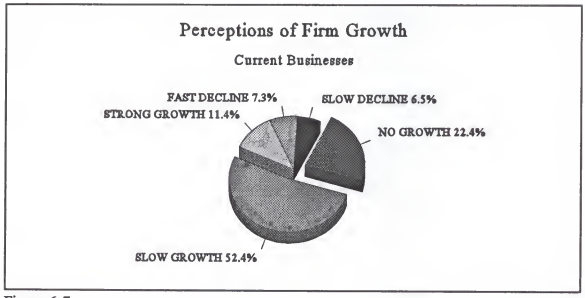

Figure 6-7

Subsequently, existing enterprise owners identified the factors which inhibit the growth of their business (question A12, Appendix C). Three levels of analysis are possible here, namely: (1) total responses for each factor among those surveyed, (2) number of factors chosen by each respondent, and (3) total responses among the four economic sectors. Respondents were asked to choose among nine possible options. At the first level, 26 percent identified insufficient internal finance as a constraint on business expansion. Thirteen percent responded that they were unable to get a loan for the business. Nineteen percent of current owners further identified excess supply in the marketplace for their product or service as inhibiting growth; 13 percent cited low demand

as a factor inhibiting firm growth.[7] In sum, of a total of 1080 responses given by the 542 businesses, over 70 percent identified (1) access to business finance or (2) poor marketability, as factors which inhibit growth of the enterprise (Fig. 6-8).

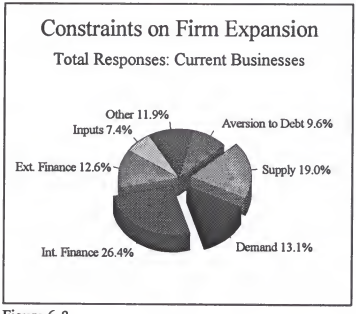

Figure 6-8

At the second level of analysis, the factor identified can be weighted by the total number of factors chosen by any one respondent. For example, 229 of the 542 respondents (42 percent) chose only one factor which inhibited firm growth. Another 162 respondents (30 percent) chose two factors. Together, these two groups accounted for 71 percent of all responses to this question. *For those choosing only one factor, lack of internal finance accounted for 31 percent; external finance, an additional 10 percent; low demand, 11 percent; and excess supply, 17 percent.* These four choices explained roughly 70 percent of the obstacles to firm growth for firms that chose only one factor. When two factors were chosen by respondents, 28 percent cited internal and external finance as the two factors inhibiting business expansion. Marketability was cited by 19 percent of those with two

[7] Question A12 (#4 and #5) addresses *perceptions* of excess supply and insufficient demand on the part of the microentrepreneur. This should be distinguished from *empirical determination of excess supply or inadequate demand.* These perceptions are proxies for *marketability* or the positioning of the firm in the marketplace.

responses. Access to finance and marketability accounted for 76 percent of the two-choice responses given.

At the third level of analysis, disaggregation by economic sector can lend additional insight into the factors which constrain growth. Agriculture firms identified access to finance (internal and external) in 41 percent of their responses. Another 22 percent of agriculture responses identified excess supply and limited access to inputs as constraints on growth. Retail businesses elected access to finance and marketability in 79 percent of their responses; for manufacturing and services, the same factors accounted for 65 percent and 71 percent of responses, respectively. Again, for firms choosing only one constraining factor, internal finance was identified by roughly 25 percent of respondents for each sector.

Responses concerning credit or cash only sales indicate an increased liquidity constraint for current businesses. Sixty-three percent of sampled firms extend credit to their customers. Among those firms which extend credit, 47 percent were retail firms. When combined with poor access to finance, these credit sales may increase propensity of firm failure, as the microenterprise is "squeezed from both ends" -- it needs cash for inputs while cash flow is constrained by the size and performance of accounts receivable.

Businesses were also surveyed regarding (1) start-up financing and (2) current financing of operations. Again, three levels of analysis can be made. For start-up capital, personal funds accounted for 62 percent of total responses; when funds available from family members are included, the figure increases to 78 percent. Most notable is the dearth of bank and non-bank credit in business start-ups. Only 3 percent of total

responses cited the use of bank loans as start-up capital; another 3 percent of start-up capital came from other non-bank institutions.

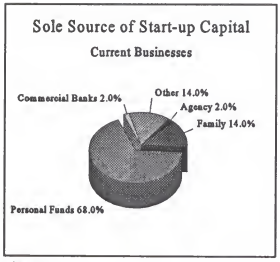

Figure 6-9

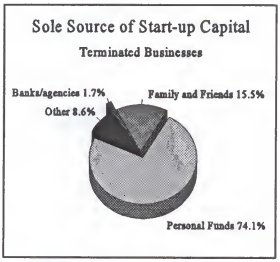

Figure 6-10

Eighty-two percent of existing enterprises (449 total) indicated only one source for start-up capital. Two-thirds of these firms cited personal funds as the sole source of their start-up capital; another 14 percent stated that family members provided start-up capital. Institutional finance was cited by only 17 firms (3 percent). Personal funds was the sole source of start-up capital for 65 percent of retail firms; for agriculture, manufacturing and services, this sole source represented 70 percent, 73 percent and 72 percent, respectively (Fig. 6-9).

Levels of start-up capital for current enterprises varied across economic sectors (Table 6-14). Median start-up capital for both agricultural enterprises stood at G$ 20,000 and for services median start-up cost was G$ 25,000; both these figures were more than twice the level of median manufacturing start-up capital (G$ 9,000). Retail enterprises required the least amount of start-up capital (G$ 7,200).

Table 6-14: Start-up Capital by Sector, Current Microenterprises

Start-up Capital by Sectors	mean	std. error	median	mode	max.	min.
Agriculture (n=103)	105,136.0	19,776.4	20,000.0	20,000.0	1,000,000.0	20.0
Manufacturing (n=34)	58,265.6	21,146.8	9,000.0	500.0	677,000.0	100.0
Retail (n=183)	93,138.1	27,671.6	7,200.0	5,000.0	3,000,000.0	5,000.0
Services (n=98)	258,634.4	64,930.6	25,000.0	10,000.0	3,400,000.0	20.0
All Current Enterprises (n=418)	132,058.6	20,366.0	12,000.0	10,000.0	3,400,000.0	20.0

Terminated businesses also provided data on the sources of their start-up capital. Again three levels of analysis are possible: total responses, type and number of responses for each respondent, and responses across economic sectors. The terminated businesses chose 155 responses among the six alternatives given; two-thirds of the responses indicated personal funds were used at start-up and another nineteen percent indicated family members provided start-up capital. Banks and other institutions accounted for four percent of total responses. Eighty-four percent of the respondents (eighty-six total) chose only one of the six possible alternatives (Fig. 6-10). Three-fourths of these responses indicated that personal funds served as start-up capital. For those respondents indicating a sole source of start-up funding, commercial banks and other agencies represented an insignificant proportion (1 percent) of all responses. Loans from family members were indicated as the sole source of start-up funds by seventeen respondents (15 percent).

When analyzed according to economic sectors, sources of start-up capital are equally dominated by personal and family funds (Table 6-15). Over eighty percent of

start-up capital came from personal or family sources for each of the economic sectors. At the other extreme, banks and agencies played little or no role in the start-up capital requirements for these enterprises.

Table 6-15: Sources of Start-up Capital, Terminated Businesses (percent of total responses)

SECTOR	Personal and/or family funds	Banks and Agencies	Other
Agriculture	80	4	16
Manufacturing	82	6	12
Retail	86	1	11
Services	91	0	9

Turning to current finance of the business, a total of 844 responses were given across nine alternatives. As with sources of start-up capital, current capital is primarily obtained from personal funds and loans from family members. Fifty-two percent (440 respondents) indicated personal funds as the source for current capital of the business; family borrowing accounted for an additional 10 percent of total responses given, followed closely by trade credit (10 percent). Sixteen responses (2 percent) indicated bank finance was used for current operations; agencies or other institutions accounted for 1 percent of total responses given (Fig. 6-11). Fifty-nine percent of current businesses indicated only one source for current capital. Of these businesses, 80 percent financed operations with personal funds (Fig. 6-12). These two sources explained slightly more than 60 percent of current financing across each of the four economic sectors.

Regarding operating capital for the terminated enterprises, 219 responses were given among the nine possible options. Personal and family funds accounted for 62 percent of all responses given. Banks and other institutional credit sources made up 3 percent of total responses, while trade credit and ROSCAs each garnered 9 percent (Fig. 6- 13). Fifty-eight percent of the respondents indicated a single source for their operating

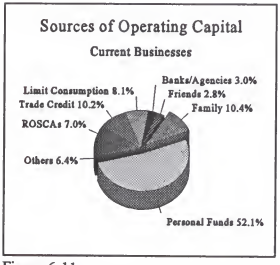

Figure 6-11

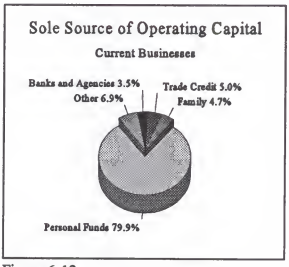

Figure 6-12

capital; for sixty-nine of these, that source was personal funds. Again, when disaggregated according to economic sector, the majority of operating capital came from personal and family sources. For agriculture, manufacturing, retail and services, these two sources of operating funds accounted for 62 percent, 65 percent, 61 percent and 63 percent of responses, respectively. Banks and agency credit for these same sectors registered 6 percent, 4 percent, 2 percent and 0 percent of responses, respectively.

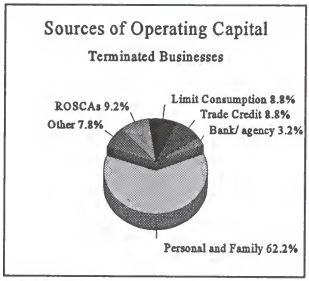

Figure 6-13

Two-thirds of the terminated businesses indicated that they purchased inputs on a cash only basis. However, a majority (57 percent) offered credit to their customers. When asked about the severity of the liquidity constraint in running their business, 54 percent indicated that it was severe or very severe. The combination of (1) cash outlays for inputs and (2) credit sales, may have placed excessive constraints on the firm's cash flow. This could well have been a decisive factor in the ultimate closure of the business.

That so many firms would be capable of internally financing their operations indicates some reliance on savings among these microenterprises. This view is supported by the savings behavior identified for the existing enterprises. Seventy percent of current enterprises indicate that they do save; two-thirds of these savers have accounts at commercial banks. Seventy-nine of terminated enterprises (57 percent) indicated that they save; two-thirds of these savers maintain accounts at a commercial bank. However, many had not been able to save during the last month or over the past twelve months. Remittances from abroad may account for some portion of surplus funds available to these businesses. However, the data obtained on business and household income indicate that most income is generated by the microenterprise, implying that remittances may be less of

a factor. Respondents consistently noted that they reinvest profits back into the business; this is yet another form of savings.

Summary

In this chapter, I have reviewed the data collection process, including the construction of the survey instrument and design of the sample, and described the results of the survey. The research succeeded in reaching the microenterprise in that 98 percent of the enterprises identified met the criteria for microenterprises (i.e., total labor force of ten or less). In most cases, these enterprises are full-time endeavors. Mean survival duration for the sample is 8.4 years. Over half of the microenterprises indicated that growth was slow in their business. Nearly 40 percent of the businesses revealed that access to finance--either internal or external--represented a constraint on the business' ability to expand. The importance of finance is further substantiated by the fact that over two-thirds of existing enterprises and three-fourths of terminated enterprises used personal funds to start their businesses. Less than six percent of the total sample had received external finance from commercial banks or other financial intermediaries.

CHAPTER 7
RESULTS

Introduction

In Chapter 5, I presented a variety of empirical approaches designed to assess the hazard of the household microenterprise. Methods were detailed for the nonparametric and parametric estimations of the hazard, survivor and integrated hazard functions. The Cox proportional hazards model was also identified as a means of relating the hazard of Guyanese household microenterprise to a set of covariates. The reader will recall that in Chapter 4, as part of the theoretical framework for the research, a set of explanatory variables was identified and its relationship to hazard (or its converse, survival) was detailed.

In this chapter, I present and discuss the results of the empirical estimations undertaken using duration data from the sample of Guyanese household microenterprises. First, the results of the nonparametric maximum likelihood estimates for the hazard, survivor and integrated hazard functions, as outlined by Kaplan and Meier (1958), Cox (1972) and Kiefer (1988), are discussed. Then, a comparison is made between these nonparametric estimations and parametric fits of the data to the exponential and Weibull distributions. Next, the covariates, as identified in Chapter 4, are included in a series of estimations applying the Cox proportional hazards model. Estimation of the Cox proportional hazards model follows the partial likelihood technique (Cox 1972).

Results of Nonparametric and Parametric Estimation

Nonparametric Estimation Without Covariates

The nonparametric estimates of the hazard, survivor and integrated hazard functions are given in Table 7-1. There are forty-eight distinct spells identified in the data set (Table 7-1, col. 1 and 2). Recall that the spell t_j denotes the span of time from the start of the enterprise until its termination. Those enterprises currently in operation were censored at the time of data gathering. Mean spell duration was 8.063 years; spells ranged in duration from a minimum of one year to a maximum of 48 years. Table 7-1, col. 1-2 constitute a histogram giving the frequency of each distinct spell in the data set. For all

Table 7-1: Nonparametric Survivor, Hazard and Integrated Hazard Estimates

(1) t_j	(2) h_j	(3) n_j	(4) Hazard	(5) Survivor	(6) Integrated Hazard
1	108	680	0.159	0.841	0.159
2	88	572	0.154	0.712	0.313
3	71	484	0.147	0.607	0.459
4	68	413	0.165	0.507	0.624
5	41	345	0.119	0.447	0.743
6	51	304	0.168	0.372	0.911
7	27	253	0.107	0.332	1.017
8	14	226	0.062	0.312	1.079
9	13	212	0.061	0.293	1.141
10	12	199	0.060	0.275	1.201

Table 7-1 (continued): Nonparametric Survivor, Hazard and Integrated Hazard Estimates

(1) t_j	(2) h_j	(3) n_j	(4) Hazard	(5) Survivor	(6) Integrated Hazard
11	27	187	0.144	0.235	1.345
12	13	160	0.081	0.216	1.427
13	7	147	0.048	0.206	1.474
14	10	140	0.071	0.191	1.546
15	8	130	0.062	0.179	1.607
16	19	122	.156	0.151	1.763
17	6	103	0.058	0.143	1.821
18	5	97	0.052	0.135	1.873
19	4	92	0.043	0.129	1.916
20	9	88	0.102	0.116	2.018
21	7	79	0.089	0.106	2.107
22	3	72	0.042	0.101	2.149
23	3	69	0.043	0.097	2.192
24	1	66	0.015	0.096	2.207
25	4	65	0.062	0.090	2.269
26	3	61	0.049	0.085	2.318
27	2	58	0.034	0.082	2.353
28	1	56	0.018	0.081	2.370
29	1	55	0.018	0.079	2.389
31	1	54	0.019	0.078	2.407
32	2	53	0.038	0.075	2.445
36	2	51	0.039	0.072	2.484

Table 7-1 (continued): Nonparametric Survivor, Hazard and Integrated Hazard Estimates

(1) t_j	(2) h_j	(3) n_j	(4) Hazard	(5) Survivor	(6) Integrated Hazard
37	3	49	0.061	0.068	2.545
38	2	46	0.043	0.065	2.589
39	1	44	0.023	0.063	2.611
40	3	43	0.070	0.059	2.681
41	2	40	0.050	0.056	2.731
42	1	38	0.026	0.054	2.758
43	1	37	0.027	0.053	2.785
45	1	36	0.028	0.051	2.812
46	2	35	0.057	0.049	2.869
47	1	33	0.030	0.047	2.900
48	1	32	0.031	0.046	2.931
51	1	31	0.032	0.044	2.963
53	1	30	0.033	0.043	2.997
57	1	29	0.034	0.041	3.031
58	1	28	0.036	0.040	3.067
60	5	27	0.185	0.032	3.252

spells where $h_j > 1$, the value given indicates the number of ties in spell completion across the data set. A total of 108 HMEs (15.8 percent of total) registered spells of one year, i.e., $t_j=1$; slightly more than one-half of all HMEs reported spells of five years or less ($t_j \leq 5$).

The hazard function, as given in Table 7-1, col. 4, is estimated by applying the formula presented in eq. (5-6), namely $\hat{\lambda}_j = \frac{h_j}{n_j}$. First, note the general downward trend

in the nonparametric hazard function, indicative of negative duration dependence (Fig. 7-1). The hazard function reaches a maximum at 0.168 (t_j = six years); this is interpreted as a failure rate of 16.8 percent for those firms which have reached their sixth year of operation. A minimum hazard rate of 0.015 is achieved at t_j = 24 years. The data imply a process by which household microenterprises improve their survival chances (i.e., decrease their hazard rate) as their survival time increases. This would appear to coincide with the *learning-by-doing* model of Jovanovic (1982).

Closer inspection of the hazard function reveals "spikes" in the hazard function where the hazard rate increases significantly from one year to the next. These spikes occured at survival durations of four, six, eleven, sixteen, twenty, twenty-five, thirty-seven, forty and forty-six years. How can these spikes be explained? These could represent specific milestones in the life span of the household microenterprise. For example, the hazard rate shows a steady downward trend in durations of one to three years. The sudden increase in the hazard rate for spells lasting four years could indicate a common obstacle which all firms face in their fourth year of operations which tends to cause relatively larger numbers of enterprise closures. This explanation seems plausible for durations up to twenty years. After twenty years, the spikes appear to represent outlier observations.

The survivor function is a product function of the hazard rate for each observed survival spell (see eq. 5-7); its smooth hyperbolic shape results from the survivor rate for each spell being less than one (Fig 7-2). One must be careful in interpreting the survivor function. Its downward trend does not denote decreased firm survival over time; rather, the downward trend reveals *those enterprises which drop out of the survivor set from one*

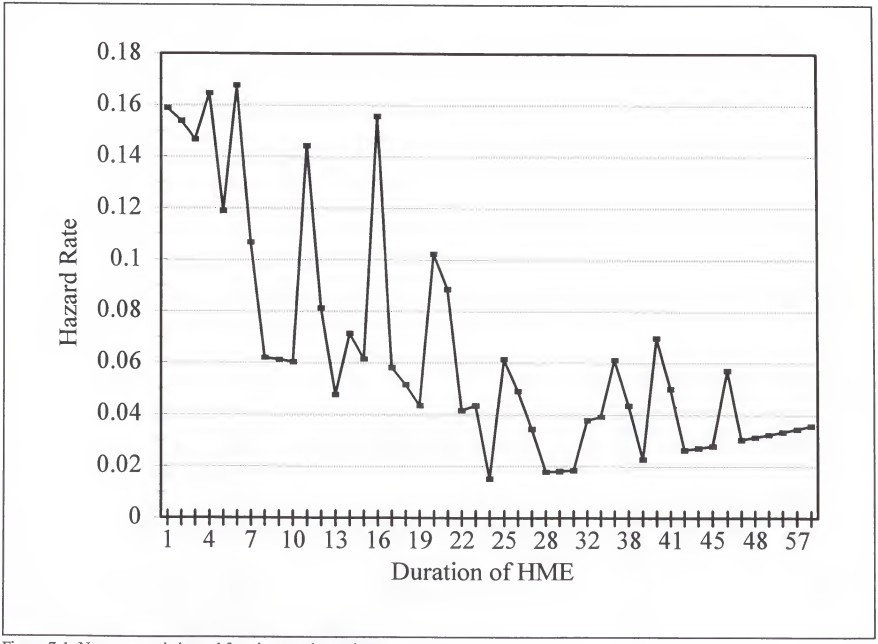

Figure 7-1: Nonparametric hazard function, total sample

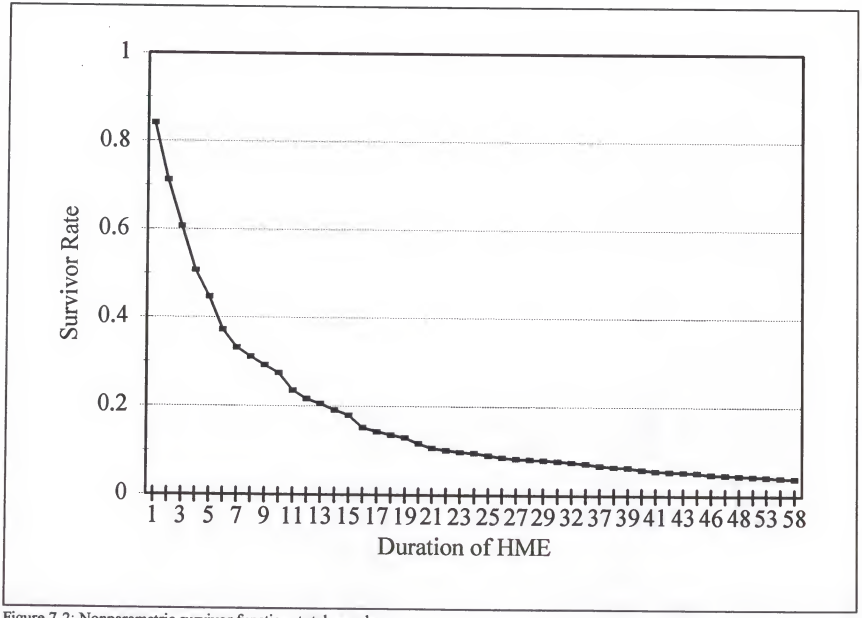

Figure 7-2: Nonparametric survivor function, total sample

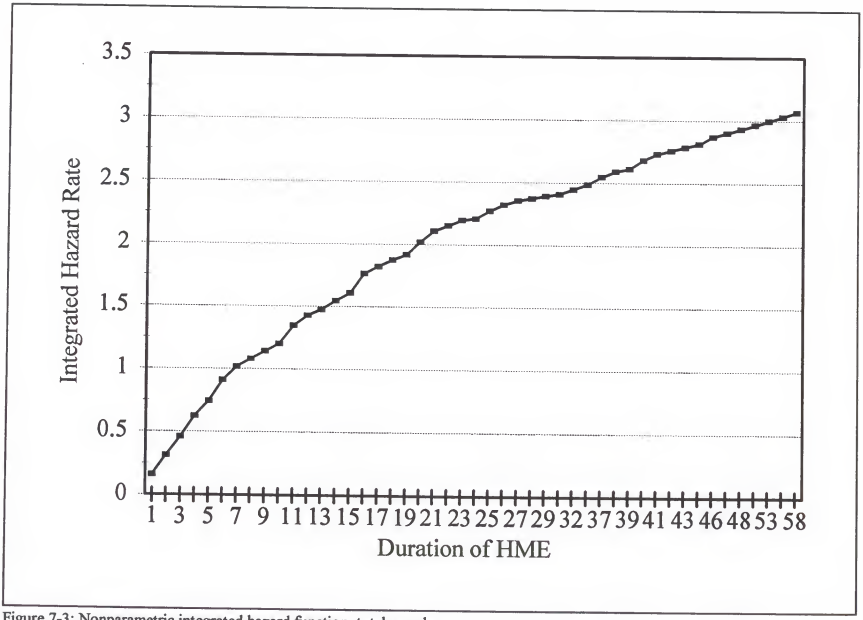

Figure 7-3: Nonparametric integrated hazard function, total sample

spell to the next. The steepness of the function in early years of enterprise survival (e.g., spells of one to five years) corroborates the conventional wisdom that survival is most difficult at early stages of enterprise development. This is precisely when those firms which are able to learn and adapt survive the "weeding out" process. For instance, 84 percent of HMEs survived after the first year of operations; by year four, those surviving were only 50 percent of the original sample.

The integrated hazard function sums the hazard rates for each successive survival spell (Fig. 7-3). Where the hazard rate is constant over time, the integrated hazard function would yield a straight line. A concave integrated hazard function therefore indicates negative duration dependence or a decreasing hazard rate over time.

Additional insight into the hazard and survival of these HMEs can be gleaned by comparisons of subsets of the data. Chapter 5 identified a set of independent variables believed to impact the hazard of the HME. By disaggregating the data set with respect to these independent variables and estimating nonparametric hazard, survivor and integrated hazard functions, we can draw inferences as to the impact of these covariates on survival of the HME. This graphical analysis will later be compared with the econometric estimation of the Cox proportional hazards model.

All HMEs in the sample were categorized with respect to the gender of the owner. In Figs. 7-4 to 7-6, hazard, survivor and integrated hazard functions are shown for female and male-owned HMEs.[1] The graphs confirm that gender has an impact on HME survival.

[1] Three categories were possible for HME ownership: female, joint and male. Female and male ownership accounts for 94 percent of all HMEs in the sample.

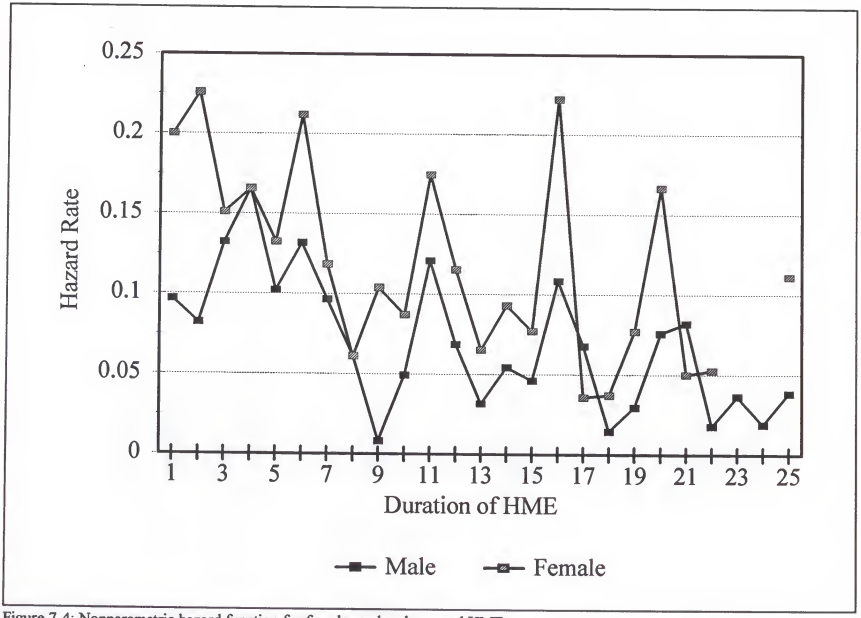

Figure 7-4: Nonparametric hazard function for female- and male-owned HMEs

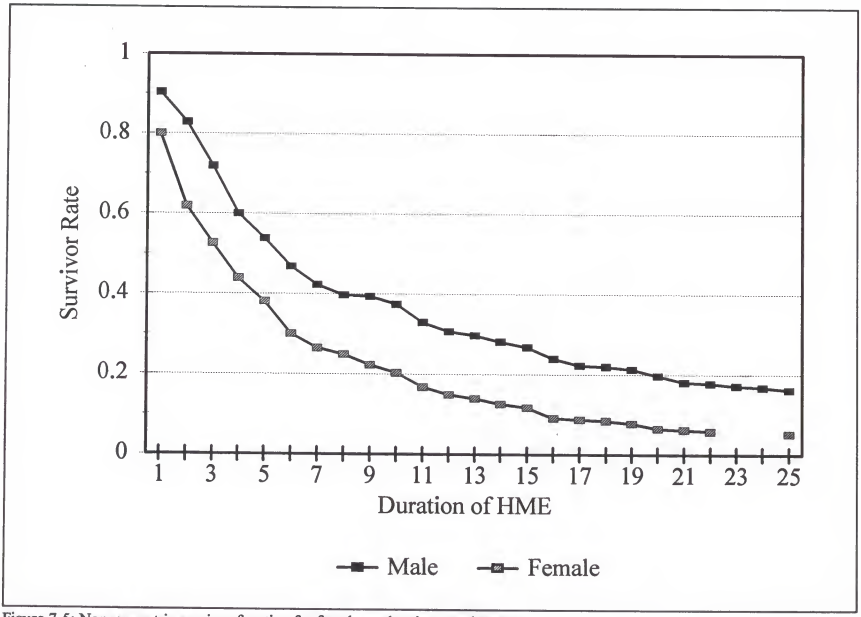

Figure 7-5: Nonparametric survivor function for female- and male-owned HMEs

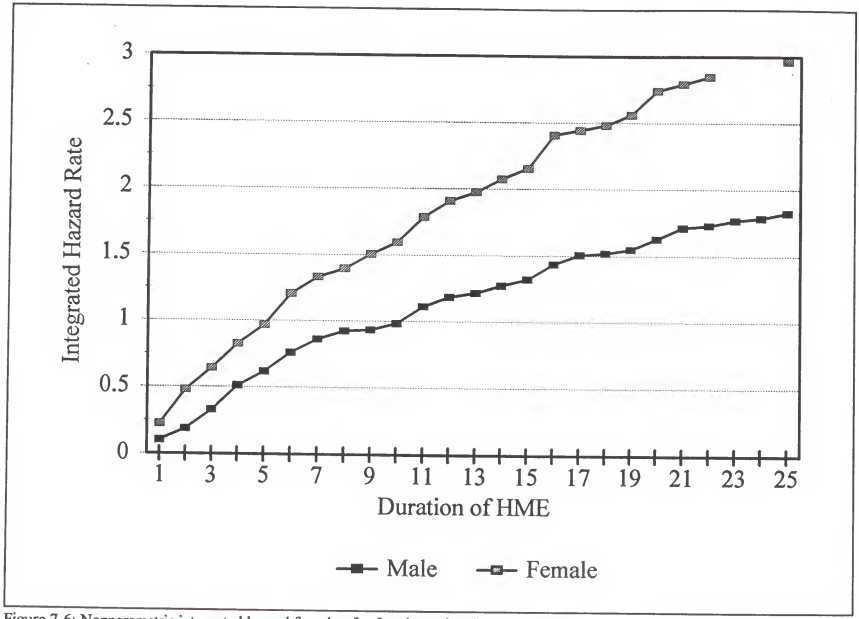

Figure 7-6: Nonparametric integrated hazard function for female- and male-owned HMEs

Hazard rates for male-owned HMEs are consistently lower than hazard rates for female-owned HMEs (Fig. 7-4). Hazard for the male-owned HMEs ranges from 0.166 ($t_j = 4$ years) to 0.008 ($t_j = 9$ years). For female-owned HMEs, the maximum hazard rate occurs at $t_j = 2$ years while the minimum hazard rate is achieved at $t_j = 17$ years. For those HMEs surviving up to year two, the hazard rate for female-owned HMEs (0.226) is 2.75 times the hazard rate for male-owned HMEs (0.082). For all spells, the survivor rates and integrated hazard rates for male-owned HMEs are markedly superior to those for female-owned enterprises (Fig 7-5 and 7-6).

Next, HMEs were disaggregated according to economic sector. Each enterprise was initially classified among four sectors--agriculture, manufacturing, retail and services. By combining the latter three categories, a comparison is drawn between agricultural and non-agricultural HMEs. Figs. 7-7 to 7-9 show hazard, survivor and integrated hazard functions for agricultural and non-agricultural HMEs.

Agricultural HMEs face lower hazard rates than nonagricultural HMEs (Fig. 7-7). For $t_j = 1$, the hazard rate for agricultural HMEs is 0.144 while that for nonagricultural HMEs is 0.171. For the next two years (i.e. $t_j = 2$, $t_j = 3$) the hazard rate for agricultural HMEs shows negative duration dependence while the hazard rate for nonagricultural HMEs indicates positive duration dependence. At $t_j = 3$, the hazard for agricultural HMEs is 65 percent less than the hazard for nonagricultural HMEs. Since agriculture remains the foundation of the Guyanese economy, this could help explain why its hazard is less relative to nonagricultural pursuits. Furthermore, nonagricultural enterprises such as retail establishments, must confront transactions costs associated with imported

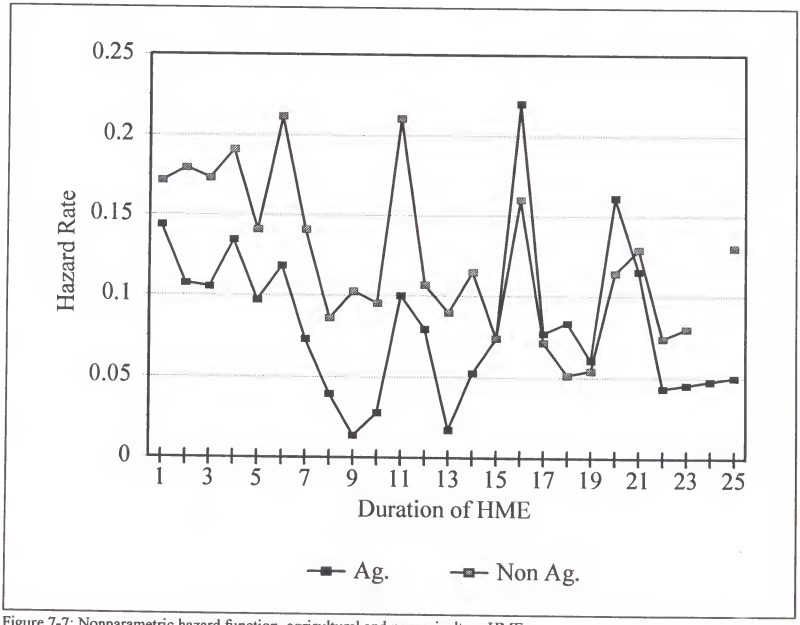

Figure 7-7: Nonparametric hazard function, agricultural and nonagriculture HMEs

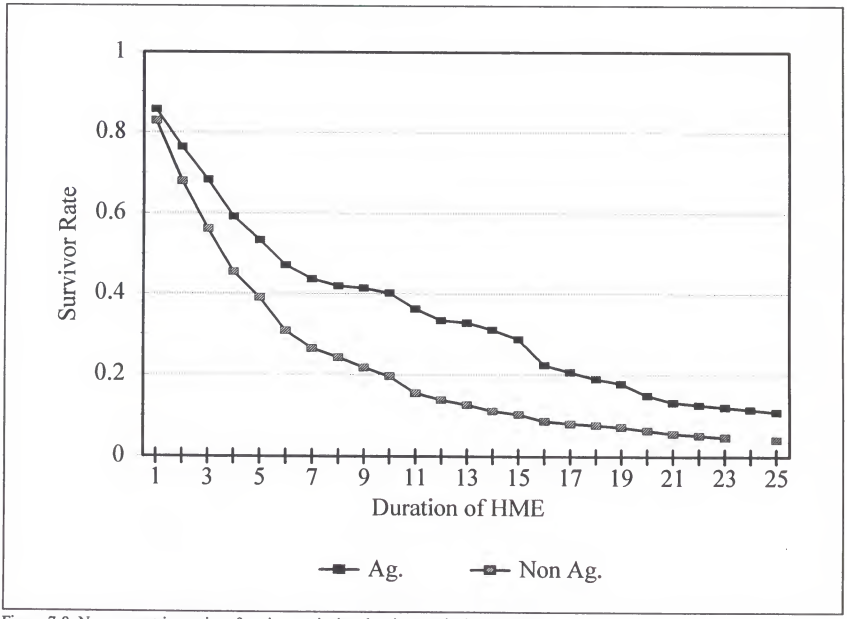

Figure 7-8: Nonparametric survivor function, agricultural and nonagricultural HMEs

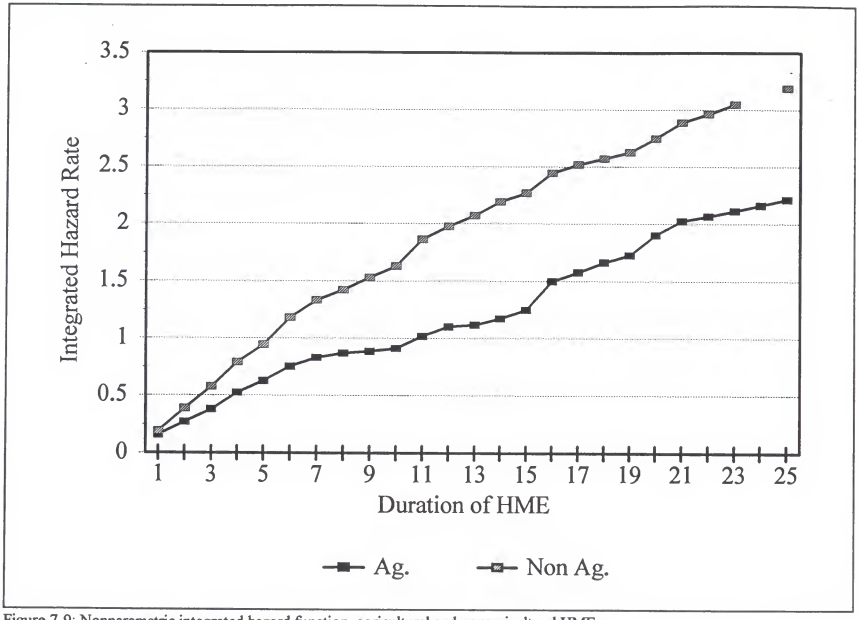

Figure 7-9: Nonparametric integrated hazard function, agricultural and nonagricultural HMEs

merchandise as well as those associated with obtaining sufficient foreign exchange. Together, these costs could act to increase the hazard of these enterprises relative to agricultural HMEs.

The ability to maintain operations with sufficient liquidity is paramount to enterprise survival. At the time of enterprise start-up, access to sufficient finance dictates whether needed plant and equipment can be purchased. It may therefore be insightful to assess hazard rates with respect to sources of start-up capital for the HME. Figs. 7-10 to 7-12 compare the hazard, survivor and integrated hazard functions with respect to internal and external capital used at enterprise start-up. For those enterprises with spells of seven years or less ($t_j \leq 7$), the source of start-up capital appears to matter in the hazard rate these firms face (Fig. 7-10). Firms using internal start-up capital (e.g., personal funds) face virtually the same hazard as externally financed firms at the point of start-up; however, while the hazard rate quickly declines for externally financed HMEs, the hazard rate for internally financed HMEs increases through spells of six years or less. This divergence in hazard rates is similar to that found between agricultural and nonagricultural HMEs. At all points along the survivor and integrated hazard functions, HMEs financed with external start-up capital faired better than those accessing internal start-up funds (Fig. 7-11, 7-12).

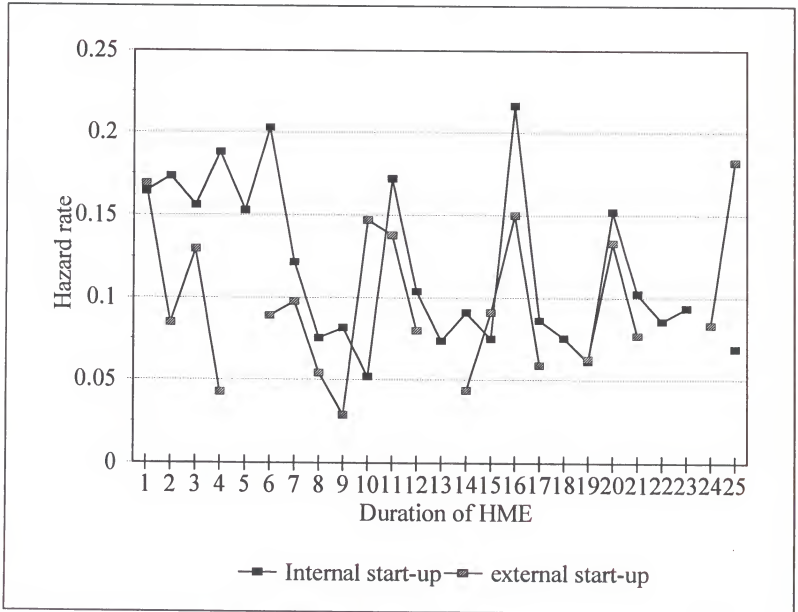

Figure 7-10: Nonparametric hazard function by source of start-up capital

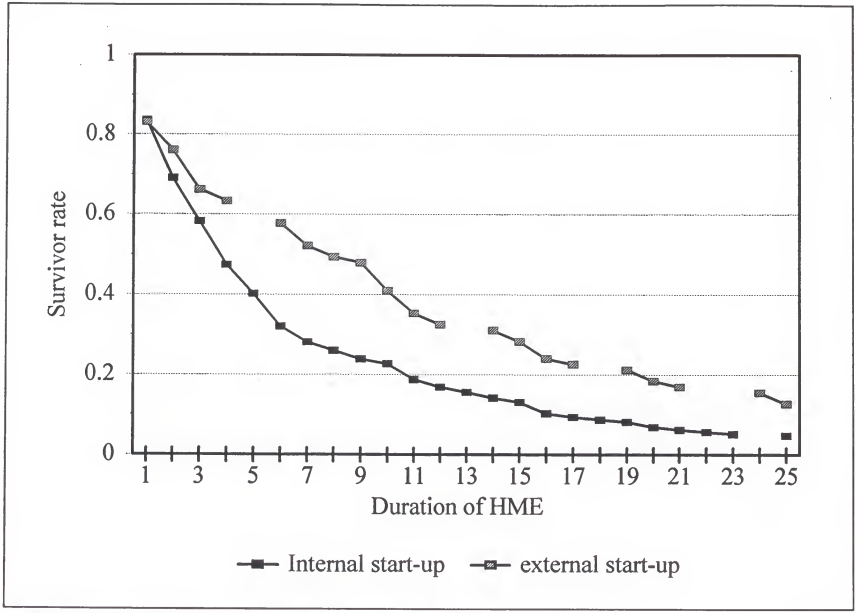

Figure 7-11: Nonparametric survivor function by source of start-up capital

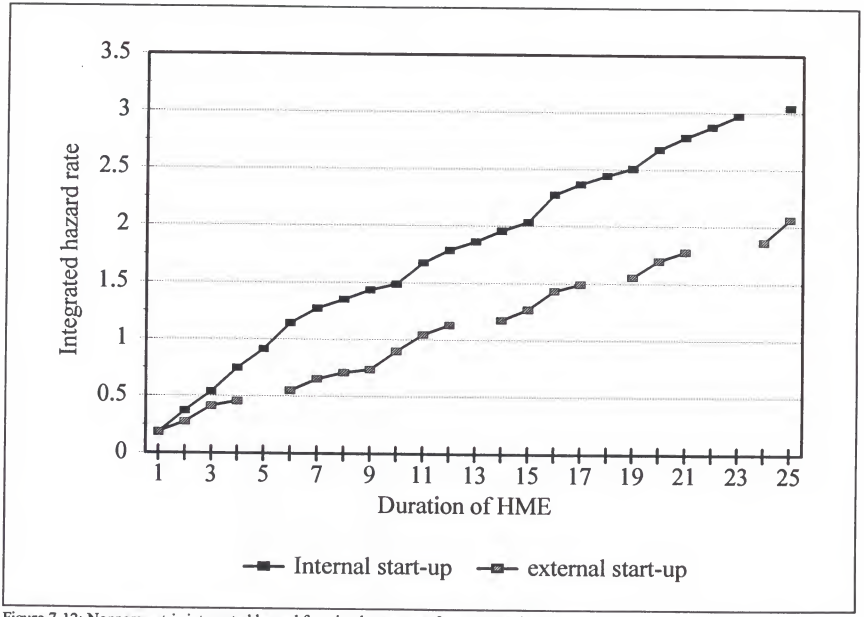

Figure 7-12: Nonparametric integrated hazard function by source of start-up capital

Parametric Estimation Without Covariates

The nonparametric estimation conducted in the preceding section is designed to let the data "speak for itself". However, in extending this privilege of free speech to the data, we simultaneously admit that the actions of HMEs--or more specifically, the actions of the HME owners--do not follow a systematic process. By identifying a parametric distribution applicable to our duration data, we imply an underlying systematic process which further permits the filling in of any gaps in the data set. In essence, by knowing some of the points on the given distribution, we can estimate the remaining points. In this section, the one-parameter exponential distribution and the two-parameter Weibull distribution are fit to our duration data and compared with the earlier obtained nonparametric estimates.

Chapter 5 discussed in detail the maximum likelihood estimation procedure for the exponential distribution. Ignoring the censoring of data for the moment, the one parameter estimate, $\hat{\theta}_{MLE}$, is equal to the mean spell duration. Using the Guyana data, $\hat{\theta}_{MLE}$=8.063. Following eq. (5-14) to account for the censoring, $\sum_{i=1}^{n} d_i$= 138, which equals the sum of the terminated household microenterprises and $\sum_{i=1}^{n} t_i$=5,943, equals the sum over all the spells of duration. Therefore, $\hat{\theta}_{MLE}$=138/5,943=0.0231. Figs. 7-13 to 7-15 compare the estimated hazard, survivor and integrated hazard function under an exponential distribution to their nonparametric counterparts.

The appropriateness of the exponential distribution for the given data set can be verified by plotting the *ln S(t)* -- where *S(t)* is the Kaplan-Meier estimate -- as a function of time (Kalbfleisch and Prentice 1980). The plot should approximate a straight line

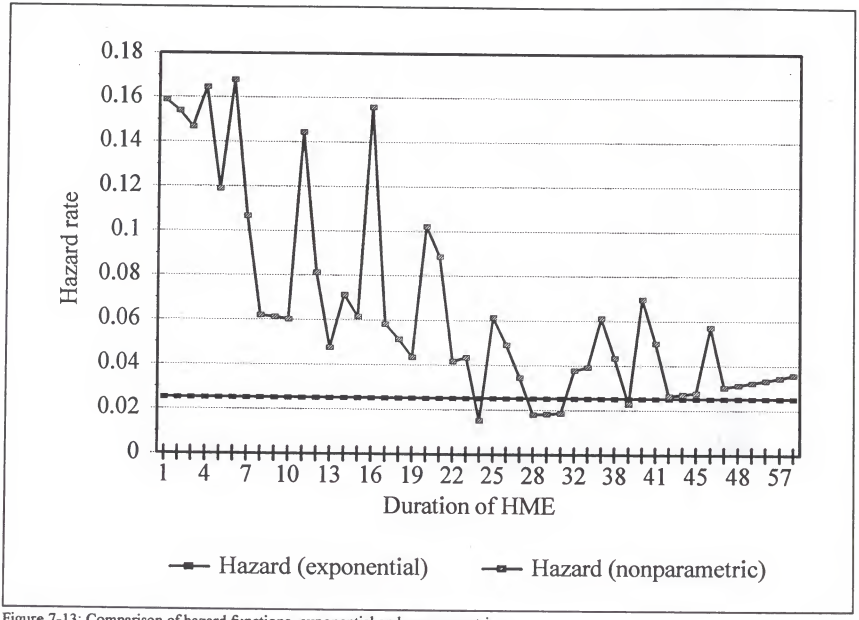

Figure 7-13: Comparison of hazard functions, exponential and nonparametric

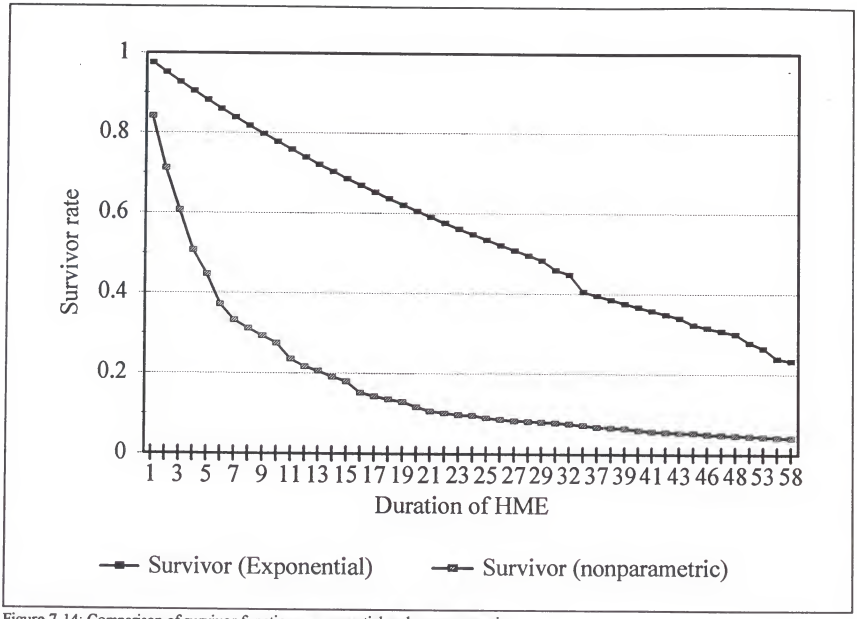

Figure 7-14: Comparison of survivor functions, exponential and nonparametric

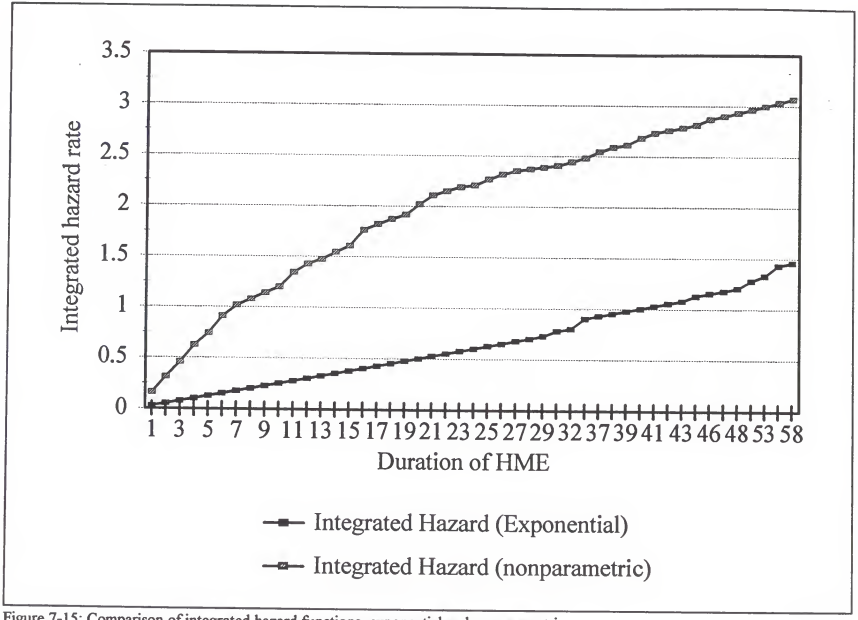

Figure 7-15: Comparison of integrated hazard functions, exponential and nonparametric

through the origin (Fig. 7-16). The exponential distribution does show a rough fit to the Guyana data. Additionally, the hazard function for the exponential distribution is a constant ($\hat{\theta}_{MLE}$ = 0.096) while the actual data (i.e., nonparametric) exhibits negative

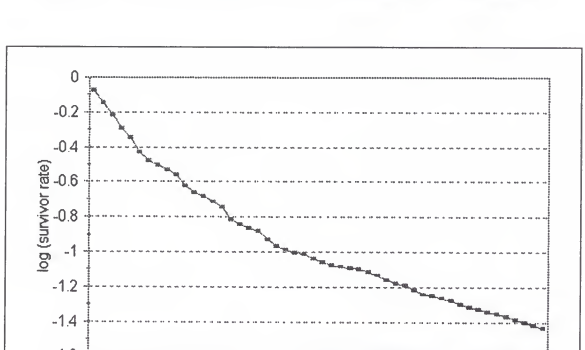

Figure 7-16: Graphical check of the exponential model

duration dependence. With regard to the stated theory of enterprise survival, the hazard function using the exponential distribution is troublesome in that it denotes a hazard process that is memoryless over time.[2] As such, use of the exponential distribution would

[2] This conclusion is similarly made by Kiefer (1988, p. 652) and used by McPherson (1995) in favor of a nonparametric estimation procedure.

conflict with our *learning-by-doing* hypothesis. We can therefore reject the exponential distribution for further use in our modeling.

The Weibull distribution, as noted earlier, is a more flexible form of the exponential distribution. When $\alpha = 1$, the Weibull and the exponential distribution are identical. Note also that it is the α restriction that yields a constant, memoryless hazard function under the exponential distribution. Using eq. (5-19), the two parameters of the Weibull distribution--α and θ--are obtained using maximum likelihood procedure; $\hat{\theta}_{MLE} = 0.0234$ and $\hat{\alpha}_{MLE} = 0.9355$. Figures 7-18 to 7-20 reveal the hazard, survivor and integrated hazard functions, respectively, applying the Weibull parametric distribution.

First, with respect to the parameter estimates, note the similarity of $\hat{\theta}_{MLE}$ and $\hat{\alpha}_{MLE}$ under the Weibull distribution when compared to the results of the exponential estimation. That $\hat{\alpha}_{MLE}$ is nearly unitary would suggest that the hazard function exhibits very slight negative duration dependence (Fig. 7-18). As for the survivor function (Fig. 7-19), there is virtually no perceptible difference between the Weibull and exponential forms.

As was done with the exponential distribution, another plot of the data can provide an empirical confirmation of the appropriateness of the Weibull model. Kalbfleisch and Prentice (1980) suggest a plot of *ln [-ln S(t)]* as a function of log time, where *S(t)* is given by the Kaplan-Meier estimate of the survivor function as shown in Table 7-1. The plot should yield an approximately straight line, with slope approximating $\hat{\theta}_{MLE}$ and the log time intercept approximating -ln α (Fig. 7-17). On the basis of the empirical check, the Weibull distribution does appear to constitute an appropriate parametric family for the Guyana data.

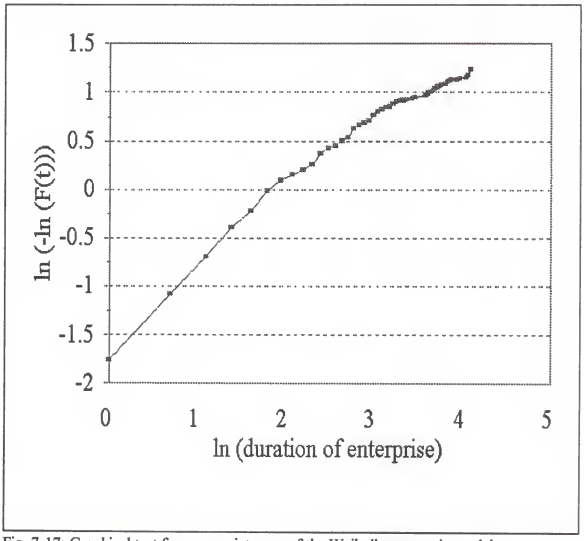

Fig. 7-17: Graphical test for appropriateness of the Weibull parametric model

Does the intuition behind these two parametric distributions concur with our *a priori* notion of the survival of the Guyanese microenterprise? As stated earlier, the exponential distribution can be dismissed on the basis of its constant, memoryless hazard function which conflicts with the *learning-by-doing* hypothesis. Inspection of the graphs for the Weibull distribution, along with the close similarity of its two parameters when compared with the exponential distribution, shows that, at least for parametric

considerations, the exponential distribution and the Weibull distribution coincide for this data set. The issue at hand is whether the data is forced into a preconceived parametric family which can make additional duration analysis more tractable, or whether we adopt a nonparametric approach.

Given that neither the exponential nor the Weibull distribution adequately describe the data, how then can hazard modeling proceed? One possibility lies in the nonparametric estimation first proposed by Cox (1972). Cox introduced a flexible model of hazard estimation that does not require specification of a parametric distribution. Also, the Cox model permits the inclusion of explanatory variables -- termed *covariates*--as a means of accounting for the inherent heterogeneity among the cross-section of household microenterprises. Chapter 5 detailed the intuition behind the proportional hazards model; in the next section, I present the results of the Cox proportional hazards estimation.

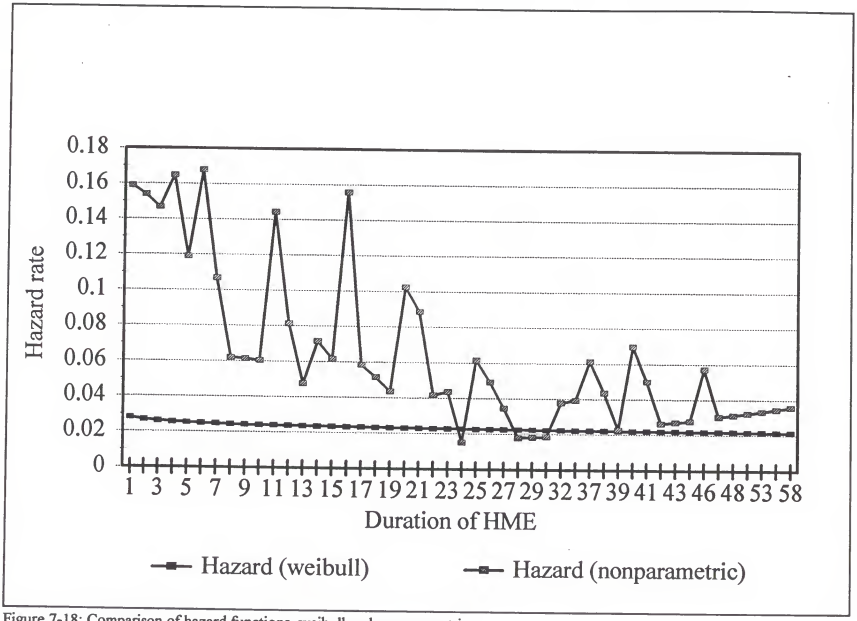

Figure 7-18: Comparison of hazard functions, weibull and nonparametric

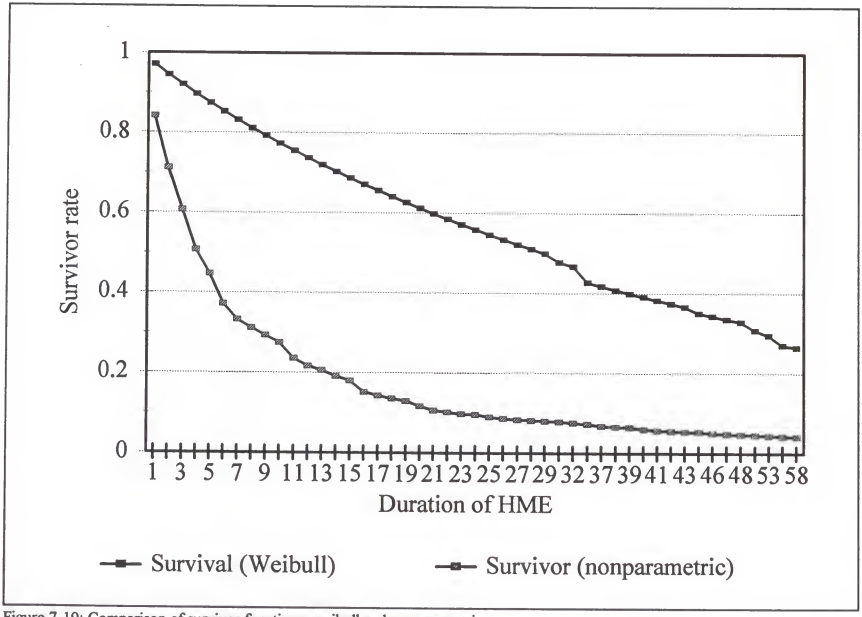

Figure 7-19: Comparison of survivor functions, weibull and nonparametric

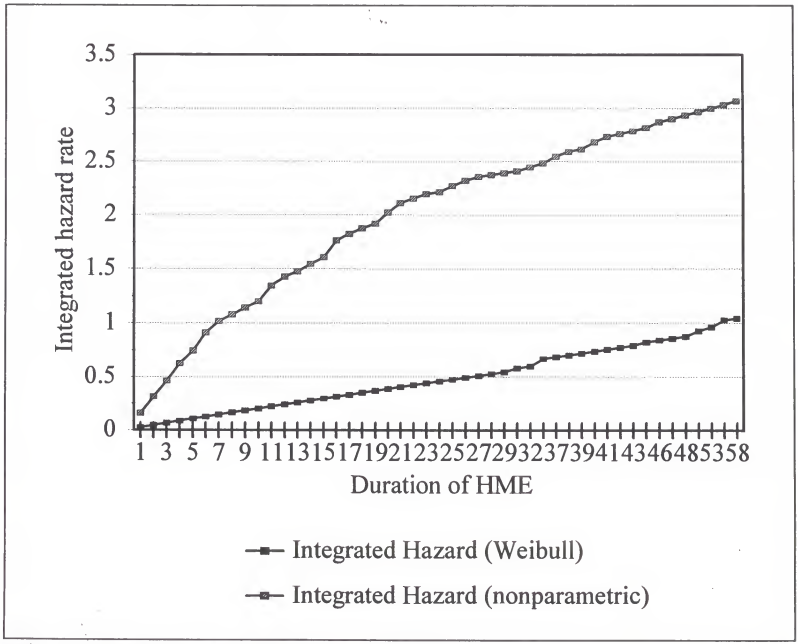

Figure 7-20: Comparison of integrated hazard functions, weibull and nonparametric

The Introduction of Covariates: Cox Proportional Hazards Estimation

In the previous two sections, completion of spell was the unit of measure which allowed the calculation of hazard and survival rates. As such, the analysis is restricted to identification of trends in these functions, e.g., duration dependence. A major limitation of this approach is the inability to relate hazard to a set of independent variables believed to impact it, as is typically performed in a regression framework. The proportional hazards model permits such relationships to be assessed.

Recalling eq. (5-20), the basic Cox proportional hazards model is as follows:

$$\lambda(t, x, \beta, \lambda_0) = \phi(x, \beta)\lambda_0(t) \qquad (7\text{-}1)$$

For convenience, $\phi(x, \beta)$ is specified in log-linear form. The hallmark of the proportional hazards model is the flexible nature of $\lambda_0(t)$, the baseline hazard function. Earlier comparison of nonparametric and possible parametric fits to the data shed light on the correct specification of $\lambda_0(t)$. If those comparisons revealed a particular parametric family appropriate for the baseline hazard, $\lambda_0(t)$ could be parameterized. However, in the absence of any appropriate parameterization, the Cox model incorporates an unspecified $\lambda_0(t)$ from which the investigation of systematic relationships between hazard and independent variables can proceed.

Chapter 4 introduced the set of independent variables believed to impact HME hazard. Those variables were (1) owner age, (2) gender, (3) economic sector , (4) geographic location, (5) liquidity and (6) prior experience. Formally, the model to be estimated is the following:

$$\lambda(t) = \phi \left(\begin{array}{c} \textit{owner age, gender,} \\ \textit{economic sector, geographic location,} \\ \textit{prior experience, liquidity} \end{array} \right) \lambda_0(t) \qquad (7\text{-}2)$$

With two exceptions, all covariates are dichotomous and constitute dummy variables. Owner age is given by the actual age of the owner.[3]

Modeling of liquidity requires some extended discussion. Under ideal circumstances, the liquidity position of any HME could be readily ascertained from a close inspection of the balance sheet and income statement and the derivation of associated financial ratios (e.g., current ratio, acid-test ratio). However, the financial accounting among HMEs rarely attains sufficient depth to permit such analyses. As such, liquidity takes the role of a latent variable. Information about liquidity is thus obtained from other variables which are believed to be correlated with it or serve as proxies for it.

Three independent measures of liquidity are specified here. First, the severity of the liquidity constraint faced by each HME is provided from questions B9 and F9 (see Appendix C). The variable SEVLIQ equals one for HMEs with severe or very severe liquidity constraints and equals zero otherwise. Second, savings can be a means of smoothing liquidity needs from internal sources; the variable SAVE equals one for those HME owners who save regularly and equals zero otherwise. Third, the acceptance of accounts receivable by the HME can enhance the liquidity constraint and cause the HME

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[3] For HMEs with completed spells (i.e., terminated HMEs) owner age is defined as the owner's age *at the time of enterprise closure*. For censored HMEs (i.e., current HMEs) owner age is taken at the time of data collection.

to be "sales rich" yet "cash poor". The variable CRSALES equals one if the HME accepts accounts receivable from customers and equals zero otherwise. These three liquidity variables are included separately in the proportional hazard estimation.

Two other variables are used as direct measures of financial access and indirectly impact liquidity. HMEs with limited access to formal financial markets will resort to internal sources of capital to finance both HME start-up and HME current operations. The variable STINT equals one for HMEs that used internal sources for start-up capital (e.g., personal funds, family funds) and equals zero otherwise. For HMEs that use internal capital to finance their current operations, the variable CURRINT equals one and equals zero otherwise.

Rounding out the set of covariates, gender refers to the gender of the HME owner. Male, female and joint ownership are possible; joint ownership serves as the base category. Economic sector is denoted by the variable AG, which equals one for agricultural HMEs and equals zero otherwise. RURAL equals one for rural HMEs and zero for all others. PRIOR equals one for those with prior business experience and equals zero otherwise. For HMEs founded by the current owners, STARTER equals one and equals zero otherwise. Table 7-2 presents the mean and standard deviation for the variables in the proportional hazards model.

Table 7-2: Descriptive Statistics for Variables in Proportional Hazards Model

Variable Name	Variable Description	Total Sample		Female-owned HMEs		Male-owned HMEs	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
SPELL[a]	Period of survival of HME	8.348	11.161	6.65	9.21	9.63	10.85
STATUS[a]	uncensored observation	0.203	0.403	0.26	0.44	0.16	0.37
OWNAGE	Owner age	40.154	13.340	39.26	12.34	40.88	14.47
MALE	Male-owned HME	0.442	0.497	-	-	-	-
FEMALE	Female-owned HME	0.458	0.500	-	-	-	-
AG	Agricultural HME	0.272	0.445	0.15	0.36	0.37	0.48
RURAL	Rural HME	0.694	0.461	0.68	0.47	0.70	0.46
EDUC	Primary school	0.941	0.236	0.95	0.22	0.93	0.26
STINT	Use of internal start-up capital	0.890	0.314	0.89	0.31	0.89	0.31
CURRINT	Use of internal current capital	0.916	0.277	0.91	0.29	0.91	0.28
SEVLIQ	Severity, liquidity constraint	0.606	0.489	0.638	0.481	0.580	0.494
SAVE	Savers	0.687	0.464	0.63	0.48	0.72	0.45
CRSALES	HME accepts credit	0.630	0.483	0.65	0.48	0.63	0.48
PRIOR	Prior business experience	0.446	0.500	0.34	0.48	0.57	0.50

[a] Used to calculate the left-hand side of the proportional hazards model

While the descriptive statistics were detailed in Chapter 6, it is worthwhile to reiterate some key findings here. First, on average, these household microenterprises survived for just over eight years. This figures masks the fact that in the data, nearly one in six enterprises survives only one year or less. The businesses were fairly evenly distributed between male and female ownership; agricultural HMEs constituted 27 percent of the sample. Nearly 70 percent of these enterprises were rural; 45 percent indicated prior experience in business activities. Two out of three HMEs indicated that they saved and roughly the same proportion permited credit sales to their customers. In eighty-five percent of these enterprises, those who responded to the survey started the business. Finally, on average, family labor accounted for seventy-five percent of the total labor force in the household microenterprise.

Estimation of the proportional hazards model specified in eq. (7-2) was performed using the LIMDEP 7.0 software. LIMDEP maximizes the likelihood function specified in eq. 5-26, while simultaneously accounting for censoring and ties in the data. Initial results are shown in Table 7-3. Specification of the model can be tested by (1) likelihood ratio test and (2) log-rank test.[4] For the likelihood ratio test, the test statistic is distributed χ^2 with 12 degrees of freedom and is calculated as follows:

$$LR = -2(Restricted\ Ln\ L - Unrestricted\ Ln\ L) \qquad (7\text{-}3)$$

For this estimation, LR = 124.82. At the α=0.05 level, we can conclude that the coefficients of the proportional hazards model are not jointly equal to zero. The log-rank

[4] See Mantel (1966) for a discussion of the log-rank test relevant to survival analysis.

test, also distributed χ^2 with 12 degrees of freedom produces a test statistic of 114.65, which also implies that the coefficients are not jointly equal to zero.

Table 7-3: Estimation of Proportional Hazards Model (n=680 observations)

Variable	Coefficient	Standard Error
OWNAGE [a]	-0.030	0.004
MALE	-0.142	0.148
FEMALE	0.146	0.147
AG [b]	-0.188	0.112
RURAL	-0.005	0.097
EDUC	0.137	0.187
STINT [a]	0.582	0.150
CURRINT	-0.043	0.169
SEVLIQ	0.037	0.089
SAVE	-0.038	0.094
CRSALES [a]	-0.179	0.093
PRIOR [a]	-0.189	0.091
STARTER		

[a] significant at α=0.05
[b] significant at α=0.10

With the exception of owner age and family labor, all explanatory variables in the proportional hazards estimation are binary variables. As such, the effects associated with these binary variables are termed *discrete*; family labor and owner age--both continuous variables, have *marginal* effects on hazard. In interpreting the results of the estimation, it is useful to consider (1) the coefficient's significance, (2) its sign, and (3) its magnitude.

Statistical significance is determined according to the null hypothesis that the coefficient estimate is not significantly different from zero (H_0: $\beta_i = 0$). Those variables which were significant at the α=0.05 level are the dummy variables for (1) owner age (OWNAGE), (2) internal start-up capital (STINT), (3) accounts receivable (CRSALES) and (4) prior experience (PRIOR). At the α=0.05 level, the dummy for agricultural HMEs (AG) was significant. All signs on these estimates were consistent with stated expectations in Chapter 4. Specifically, owner age acts as a proxy for *learning-by-doing* in that older owners possess more business experience. Hence, as owner age increases, the hazard to the HME decreases. The effect of prior experience is similarly explained. Agricultural HMEs are associated with decreased hazard rates when compared to non-agricultural HMEs. This was supported by the earlier nonparametric hazard, survivor and integrated hazard estimates for agricultural and non-agricultural HMEs (Figs. 7-7 to 7-9).

Two of the financial variables--internal start-up capital and accounts receivable--impacted HME hazard in the estimation. The presence of internal start-up capital was systematically associated with higher hazard rates for HMEs in the sample. Again, this is supported by the earlier results from nonparametric estimation (Figs. 7-10 to 7-12). A negative sign on accounts receivable (CRSALES) indicated that the presence of accounts receivable was associated with lower hazard rates, relative to cash only sales. This conflicts with the earlier assertion that credit sales may lead to "sales rich" but "cash poor" HMEs.

In regard to the magnitude of the effect of these variables on HME hazard, we must be careful to recognize that the coefficient estimates of Table 7-3 do not give the

true magnitudes. Recall that the proportional hazards model was estimated with $\phi(\cdot)$ taking a log-linear parameterization of the form,

$$\lambda_i(t) = \exp(\beta' x)\ \lambda_0(t) \tag{7-4}$$

Rearranging terms and taking logs of both sides, eq. (7-4) becomes,

$$\ln\left[\frac{\lambda_i(t)}{\lambda_0(t)}\right] = \beta' x \tag{7-5}$$

The effect of the variable x_i on the hazard rate is given by:

$$\frac{\partial \lambda_i}{\partial x_i} = \frac{\partial e^{\beta' x}}{\partial x_i} = \beta_i * e^{\beta' x} \tag{7-4}$$

Since the term $e^{\beta' x}$ is always positive, the sign of the coefficient estimate in Table 7-3 is unaffected by the transformation. The discrete or marginal effects of the significant explanatory variables (evaluated at the means of each variable) are reported in Table 7-4.

Table 7-4: Discrete and Marginal Effects, Proportional Hazards Model

Variable	owner age	agricultural HME	internal start-up	accounts receivable	prior experience
discrete or marginal effect (%)	-0.9	-17.9	97.7	-16.0	-17.4

Each of the effects reported in Table 7-4 are independent effects under the *ceteris paribus* conditions. Each additional year of owner age decreases the applicable hazard rate by nearly one percent. Non-agricultural HMEs have hazard rates which are eighteen percent higher than agricultural HMEs. Prior experience is associated with hazard rates that are seventeen percent lower than those HMEs without prior experience. Hazard rates for HMEs using internal start-up capital *are 97 percent higher than those accessing external start-up capital.* These results lend support to the argument that liquidity constraints place the HME at greater risk of failure, especially when access to external capital, i.e., formal financial markets, is limited.

It is somewhat troublesome that the effect of gender was not significant in the proportional hazards estimation. The earlier nonparametric estimates clearly indicate a marked divergence in hazard and survival rates for male- and female-owned HMEs. By applying the proportional hazards model to the full sample (n=680), it is assumed that gender has a scalar effect on the baseline hazard $\lambda_0(t)$ and that *the entire sample faces the same baseline hazard.* It is possible, however, that female- and male-owned HMEs face different baseline hazard functions. Women perform most of the day-to-day tasks associated with the care, nutrition and general well-being of children and other members of the household. They also face unique obstacles in accessing formal credit markets and can be subject to institutionalized discrimination, e.g. business permits. These circumstances make the case for separate baseline hazards for each gender.

Therefore, the next iteration of the proportional hazards model is segmented by gender. All variables listed in Table 7-2 are again included in the proportional hazards estimation. Table 7-5 presents the male and female coefficient estimates .

Table 7-5: Coefficient Estimates, Proportional Hazards Model by Gender of HME Owner

Variable Name	Female-owned HMEs		Male-owned HMEs	
	Coefficient	Standard Error	Coefficient	Standard Error
OWNAGE	-0.046[a]	0.013	-0.059[a]	0.015
AG	-0.065	0.405	0.474	0.406
RURAL	0.244	0.299	-0.637[b]	0.410
EDUC	0.161	0.621	-0.587	0.630
STINT	1.939[a]	0.764	0.240	0.497
CURRINT	0.397	0.751	0.508	1.045
SEVLIQ	0.428	0.285	-0.986[a]	0.366
SAVE	-0.225	0.267	-0.776[a]	0.364
CRSALES	-0.258	0.311	-0.352	0.364
PRIOR	-0.511[b]	0.301	-0.486	0.364

For the female-owned HMEs, owner age (OWNAGE) and internal start-up (STINT) were significant at the; prior experience (PRIOR) was significant at the α=0.10 level. For male-owned HMEs, owner age (OWNAGE), the severity of the liquidity constraint (SEVLIQ), savings behavior (SAVE) were significant in their impact on the hazard rate at the α=0.05 level; geographic location (RURAL) was significant at the α=0.10 level. As before, the coefficients must be transformed using eq. 7-4 in order to obtain the true effect (marginal or discrete) of these variables in the hazard rate. Table 7-6 gives these effects.

Table 7-6: Marginal and Discrete Effects on Hazard Rate, Female and Male HMEs (figures in percent)

Variable	OWNAGE	RURAL	STINT	SEVLIQ	SAVE	PRIOR
Female-owned HME	-0.76	-	1112.5	56.41	-	-42.71
Male-owned HME	-0.54	-41.25	-	-54.24	-44.52	-37.38

The most profound result obtained from these gender-specific estimations of the proportional hazards model is the effect of internal start-up capital on the hazard rate for female-owned HMEs. Ninety percent of female-owned HMEs began with internal start-up capital; these HMEs--according to the estimates--face substantially greater hazard rates when compared to female-owned HMEs which began using external start-up capital. That so many female-owned HMEs resort to internal sources of start-up capital begs the question of how accessible external finance is to this class of entrepreneurs. Conversely, internal start-up capital showed no association with increased hazard rates for the male-owned HMEs, despite the fact that 88 percent of male-owned HMEs began with internal start-up funds. As in the full sample estimation, increased owner age and the presence of prior experience reduce the hazard rates of HMEs across both genders.

While the magnitude of impact for the severity of the liquidity constraint is roughly identical for female- and male-owned HMEs, the sign of the impact is negative for male HMEs and positive for female HMEs. Recall that in the full sample estimation, the severity of the liquidity constraint showed no systematic association with hazard. The positive sign for female-owned HMEs is plausible; women who perceive the liquidity

constraint to be severe face hazard rates 56 percent greater than those perceiving the liquidity constraint as not severe. On the surface, the negative sign for male-owned HMEs appears counterintuitive. However, one way of explaining the negative is to focus on the cause and effect of a severe liquidity constraint on the HME. For instance, if the male-owned HME faces a severe liquidity constraint, the enterprise may then access capital from other sources to create liquidity and maintain the business function. It this way, liquidity may signal a growing business. The same can be said for the negative sign on the savings variable (SAVE) for the male-owned HMEs. It is also possible that the questions dealing with the severity of the liquidity constraint and savings behavior were interpreted differently by each gender. Nonetheless, with respect to female-owned HMEs, these results lend support to the need for greater attention to financial access, especially at the point of HME formation.

Summary

In this chapter, I have presented and discussed various econometric estimations of HME hazard. First, results from nonparametric estimation without covariates were given for the full data set and across three comparative groupings. Hazard rates were found to differ markedly with respect to gender of HME owner, as well as with regard to agricultural and non-agricultural HMEs and prior experience. Hazard rates also varied substantially when the sources of start-up capital were considered. HMEs which used internal funds to finance start-up clearly face higher hazard rates.

Second, neither the exponential nor the Weibull parametric distributions were found to provide an appropriate fit to the data. That the hazard function for the

exponential distribution is a constant conflicted with the *learning-by-doing* hypothesis of Jovanovic (1982) and with our *a priori* expectation that prior experience matters in assessing HME hazard. Graphical comparisons of both the exponential and Weibull models with the nonparametric estimations were significantly divergent to warrant discarding these parametric distributions in further modeling attempts with this data set. Finally, the semiparametric Cox proportional hazards model was estimated to enhance our assessment of HME hazard by the inclusion of a set of covariates. Once again, HMEs which began with internal start-up capital were found to face higher hazard rates, especially when gender of HME ownership is taken into account.

Chapter 8
SUMMARY AND CONCLUSIONS

This research sought to achieve the following objectives: (1) extend agricultural household theory toward a theory of the household microenterprise (HME), (2) estimate the hazard of the HME and those variables which impact it, using a sample of from Guyana, South America, and (3) explore the linkages between finance, financial intermediation and the survival of the HME, using a case study from a development financial institution in Guyana--IPED. How and why the HME evolves from within the household was a focal point of constructing an extension to existing theory on household production. Hazard modeling and the broader category of duration analysis has a long history in both medical science and engineering, yet is relatively new to economics. Here, I have used hazard modeling to examine the Guyanese HME. Special attention has been given to the unique role that finance plays in the hazard of the HME, particularly at the time of start-up but equally important during the continued operation of the HME.

A history of the entrepreneur throughout the economic literature was given in Chapter Two. The presence of incomplete (and sometimes asymmetric) information opens the door to entrepreneurship in that the individual perceives opportunity and subsequently "takes a position" to exploit it based on the expectation of profits (Cantillon 1755, Kirzner 1973). Furthermore, the ability to deploy owned resources as well as hire

those which may be needed to undertake production--termed *entrepreneurial capacity*--separates the wage laborer from the residual income recipient (Friedman 1976). The hazard of the microenterprise is largely a function of the learning by doing the entrepreneur accomplishes (Jovanovic 1982).

Finance plays a primary role in the survival of the HME, as explored in Chapter Three. Transactions costs force the formation of a "disintermediation wedge" in financial markets due to the screening, monitoring and enforcement costs incurred by the lender and the search and compliance costs incurred by the borrower. Specialized credit institutions have arisen to close the gap in financial intermediation to the HME sector; an example of such institutions in Guyana is the Institute for Private Enterprise Development. IPED's experience, as shown in the case study, yields some optimism as to both the outreach and long-term sustainability of its lending program. However, where and how future financial resources for lending will be obtained--whether from savings mobilization or commercial capital markets-- remains a major dilemma for IPED.

Chapter Four took the agricultural household model developed by Singh et al. (1986) as the point of departure for extending theory toward household microenterprise formation. Households choose between wage income and entrepreneurial income based on expected profits from the exercise of their entrepreneurial capacity. Jovanovic (1982) framed the discussion of the survival of the HME and the hypothesized relationship of a set of independent variables on enterprise survival. Owner age, prior business experience, geographic location, gender, capital access, and economic sector were hypothesized to impact HME survival and later were incorporated into an empirical hazard model.

A total of 680 Guyanese HMEs were surveyed during the research, 80 percent of which were currently operating enterprises and the remaining 20 percent were terminated enterprises. The sample was taken from twenty emumeration districts throughout Guyana. Twenty-seven percent of the sampled HMEs were agricultural HMEs. Ownership was equally distributed by gender. The average HME had survived approximately eight years. Nearly one-quarter of the currently operating HMEs stated that their business was not growing. Access to finance was cited as an obstacle to HME growth by nearly 40 percent of the respondents. Furthermore, only six percent of the sample had successfully accessed institutional finance, whether from the commercial banking sector or from development financial institutions such as IPED.

Chapter Five laid out the empirical approach to be taken in estimating HME hazard. Hazard was defined as the probability of HME failure at time $t+\Delta t$ conditioned on having survived up until time t. Nonparametric duration analysis "lets the data speak for itself" and is the first step in identifying relationships in duration data. The calculation of nonparametric hazard functions for the sample of Guyanese HMEs--accomplished in Chapter Seven--revealed that, as a whole, the hazard of these HMEs decreases over time, indicating negative duration dependence. Agricultural HMEs showed overall lower hazard rates than nonagricultural HMEs, male-owned HMEs experienced lower hazard rates than female-owned HMEs, and HMEs which began with internal sources of capital (e.g., personal savings, family funds) showed higher hazard rates than those HMEs which began which external sources of capital (e.g., bank loans). Two parametric models, based on the one-parameter exponential and the two-parameter Weibull distributions, were

rejected due to their conflict with the hypothesized learning-by-doing of HMEs which implies negative duration dependence.

Nonparametric estimation with a set of covariates was then undertaken using the Cox proportional hazards model. The model was estimated for the pooled sample of 680 HMEs under the assumption of identical baseline hazards for female- and male-owned HMEs. Owner age and prior experience--both proxies from managerial efficiency (Jovanovic 1982)--significantly decreased HME hazard. Agricultural HMEs had decreased hazard rates relative to nonagricultural HMEs. Finally, HMEs which began with internal start-up capital had higher hazard rates than those which began with external start-up capital. These results support the earlier results from nonparametric estimation without covariates.

There is nonetheless reason to believe that female- and male-owned HMEs face different baseline hazards, due to (1) the allocation of time by gender within the household and (2) the varied access to needed production inputs--namely finance--experienced by each gender. Thus, the Cox model was again estimated separately for female- and male-owned HMEs. Owner age significantly decreased the hazard rate for both genders; additionally prior experience decreased the hazard for female-owned HMEs. Start-up capital from internal sources significantly increased the hazard rate for female-owned HMEs, but not for male-owned HMEs.

In sum, this research made three distinct contributions: (1) a theoretical model of the household microenterprise, (2) an empirical model of the survival of the household microenterprise and (3) an institutional analysis of the role of financial intermediation in

the survival of the household microenterprise. In this chapter, I focus primarily on the policy implications of this research, specifically dwelling on how improved understanding of household microenterprises can stimulate innovative market responses to the demands of these enterprises.

The theory of the household microenterprise indicates that there exists a strong and symbiotic relationship between the household and the microenterprise. It is not sufficient to view this relationship as a "linkage"; more correctly, the household and the microenterprise overlap, sharing resources across a blurred or non-existent boundary. The household experiences disequilibrium via the occurrence of an *entrepreneurial event* (Schultz 1976). The event is observable to all households yet, as in Kirzner's notion of entrepreneurship, not all households *perceive* it. Furthermore, not all that perceive the event will reallocate household resources in response to it. This sequence of stimulus and response implies a degree of market power, since the supply response is less than the market demand. As such, the household microenterprise extracts monopoly rents in the early stages of operation, which diminish over time as more households both perceive and exploit the entrepreneurial opportunity.

All households face a budget constraint which sets the stage for proaction and innovation in order to squeeze the maximum benefit from their finite and, at times, insufficient resources. The presence of a budget constraint for the household gives rise to two separate yet complementary actions. First, in the absence of growth in household resources, the household can reallocate resources as a means of obtaining greater utility from its given resource set. Second, the resources themselves can be directed toward

market production, resulting in market exchange and revenues for the household. Entrepreneurship is the vehicle by which households enter market production. Here again, we can call on the "poor but efficient" hypothesis of Schultz (1964) in which he points out that poverty of resources need not imply equal poverty of ingenuity. As one continually labors in an environment of limited inputs, they eventually grow to embrace the frontier of their existing technology. These coping strategies can be harnessed in response to market signals which indicate the potential for profit to the household through reorganization of their production activities.

Estimation of the proportional hazards model lends support to the assertion that firms learn about sound business practices "on the job". Owner age was shown to be significant in the hazard of the microenterprise, both overall and by gender. Specifically, as owner age increases, the conditional probability of failure of the microenterprise decreases, since valuable experience is gained over time. Note also that prior business experience also proves to be a strong covariate; accumulated knowledge on business practices leads to improved efficiency and increases the chances that the HME will survive.

The estimation did not detect any systematic relationship between formal education and the hazard rates of these microenterprises. While the primary intervention tool of microenterprise assistance has historically been credit services, often credit has been tied to participation in technical assistance and business management training, under the premise that improved practices could then be implemented in these microenterprises, thereby increasing their chances of survival. Since only a small fraction of our sampled

microenterprises (3 percent) had accessed credit from IPED, ScotiaBank or other microenterprise financial institutions, it is not likely that the sampled businesses have participated in such training activities. It would thus be insightful to further explore the potential impact of informal education programs on microenterprise hazard rates.

Is finance truly a binding constraint for survival of the microenterprise? It was shown that source of start-up capital--whether *internal* or *external*--is related to hazard rates in that internally generated start-up funds were associated with increased hazard rates for the overall sample and for female-owned HMEs. HMEs also reported the limited access to finance as a primary obstacle in the growth and expansion of their business. Given that only six percent of HMEs were able to access institutional credit of any kind, there is reason to believe that there exists a need for improved financial intermediation at the smallest levels of enterprise activity.

We are faced with the question of whether the dearth of financial access for the HME is an example of *market failure* or *market response*. That an HME is incapable of accessing credit may be a function of the disintermediation wedge discussed in Chapter 3 or may indicate its lack of creditworthiness. In other words, a credit need is not sufficient for the credit contract to be offered. Nor is it always the case that healthy businesses will obtain the finance they require. The missing ingredient is mutual confidence. Mutual confidence is based on a shared understanding between borrower and lender of the risks and returns in the market for finance. How information circulates will ultimately determine how successful borrowers and lenders will be in building mutual confidence and forging financial contracts. That IPED, ScotiaBank and other development finance

institutions have been able to forge such contracts successfully and sustainably can and should serve as a sign to the commercial banking sector that small-scale borrowers like the HMEs are viable credit customers.

Neither the directed credit paradigm nor the efficient financial markets paradigm captures the essence of what is needed in financial markets of developing countries. Directed credit, predicated on the presumption of financial market failure, creates the incentive for supply-led financial institution formation and a unidimensional emphasis on credit delivery. Not only is the vital component of savings all too often absent from directed credit programs; such programs have also been plagued with overemphasis on dispensing credit and little or no attention to long-term financial sustainability. Supply-led responses under this paradigm may be ill-suited to the demands expressed by the microentrepreneurs and are fraught with the dangers of rent-seeking behavior on the part of program administrators. Unless financial institutions build true fiduciary relationships by mobilizing resources and simultaneously dispensing investment funds to creditworthy individuals and businesses, the financial landscape in developing countries will remain characterized by disintermediation.

The efficient capital markets paradigm correctly identifies the importance of mutual confidence in creating financial contracts yet seems to overlook the fact that a substantial segment of the population--namely the poor--can effectively manage credit. It seems clear that if formal financial institutions will ever be fully accessible to the poor--not only for savings but also for credit--innovative, indeed entrepreneurial, approaches will be required. Grameen Bank, IPED, ScotiaEnterprise and other development finance

institutions have demonstrated that, for example, the solidarity group methodology can be an effective means of enforcing the lending contract using *social collateral* rather than financial collateral.

Social ties have served the informal moneylender throughout history in guaranteeing repayment of loans. The primary tenets of mutual confidence among the parties to the transaction and the desire to minimize risk are sought in informal finance just as they are in formal finance. The burning question remains the following: Why are informal markets capable of *sustainable financial transactions* among small-scale and microenterprise when the formal financial sector is either unwilling or unable? I believe that the invariant sunk costs of formal lending create a bias toward larger borrowers on the part of formal institutions and thus limit or eliminate microenterprises from their potential portfolio due to their much smaller demand for finance. The mechanics of how and under what circumstances commercial banks can undertake such innovations to gain or improve outreach in their communities should be the topic of further research.

Can the informal financial sector be "formalized" as brokers or agents of the larger formal financial institutions in such a way that they economize on the comparative advantage that the informal sector possesses in dealing effectively with microenterprises? Policy makers would do well to encourage such linkages as a means of achieving financial integration and ensuring greater relative efficiency in overall resource allocation. Since informal lenders already have an information base from which mutual confidence can be evaluated, they could work in tandem with commercial banks to increase the coverage of full-scale financial services in rural areas. The management of IPED, for example, could

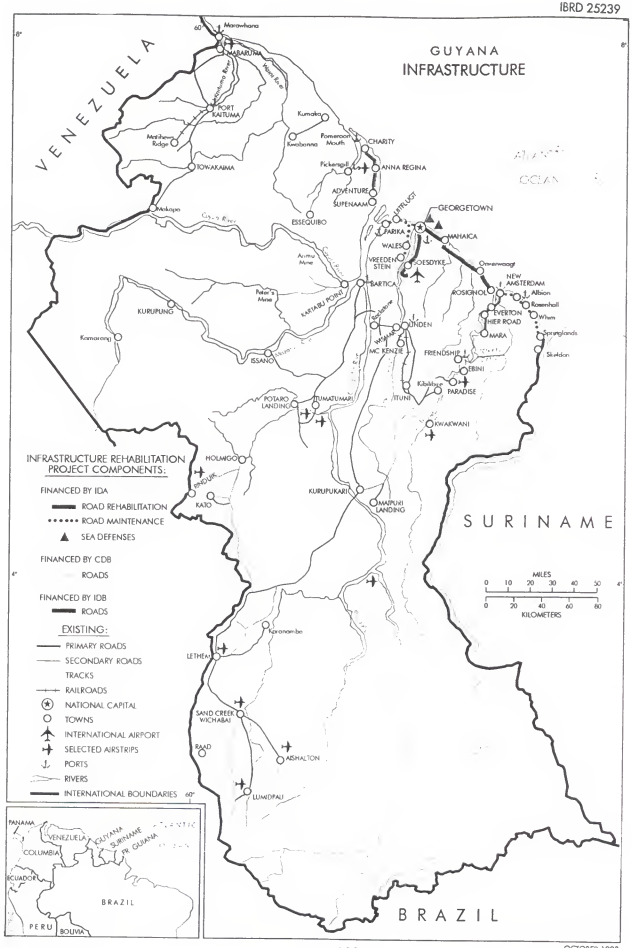
strive to forge a brokerage arrangement with one or more commercial banks in Guyana, with the commercial banks supplying the financial resources and IPED contributing the valuable human resource component of identifying and servicing viable clients. Such alliances would assist in integrating financial markets in Guyana and increasing overall resource efficiency.

Returning to the topic of hazard, what directions may be identified for future research into HME survival? This research related hazard to characteristics of the owner (e.g., owner age, prior experience, gender, education) and characteristics of the HME (economic sector, geographic location, financial access, credit sales, liquidity). Other classes of covariates can and should be identified in future work dealing with HME hazard. First, the activities of the HME can be impacted by variations in the macroeconomy. Inflation, exchange rates and formal interest rates can effect access to physical and financial inputs to HME production. Choice of economic sector within which to form an HME can also be effected by the level of volatility in the economy; instability make bias households toward retail activities and short-term ventures rather than longer-term manufacturing pursuits. Second, that HMEs have perceived an opportunity correctly would be bolstered by some treatment of the demand-side within the hazard framework.

Household microenterprises, as stated at the outset of this research, are a pervasive component of economic life in developing countries. Many of these business are survival enterprises, providing employment for family members and a means of income generation in spite of widespread unemployment. The hard reality is that, despite household efforts

to the contrary, some HMEs will indeed fail. As previously stated, enterprise failure is a given; however, when the HME fails due to binding constraints beyond its control, it is cause for concern. This research has helped to shed light on the otherwise black box of enterprise survival, specifically in Guyana, and inform policymakers as to the barriers the HME faces and ways in which such obstacles can be minimized.

APPENDIX A
MAP OF GUYANA



OCTOBER 1993

APPENDIX B
FINANCIAL STATEMENTS,
INSTITUTE FOR PRIVATE ENTERPRISE DEVELOPMENT (IPED)

Table B-1: Historical Balance Sheet, IPED, 1990 - 1994 (Figures in current G$ millions)

ASSETS	1990	1991	1992	1993	1994
Cash and Bank	6.708	34.503	22.791	8.852	10.925
Investments	13.626	103.862	257.018	289.473	348.140
TOTAL LIQUID ASSETS	20.334	138.365	279.809	298.325	359.065
Current Loans	19.229	66.783	144.365	227.492	284.616
Non-current Loans	9.685	22.680	64.545	118.294	121.173
TOTAL LOANS RECEIVABLE	28.914	89.463	208.910	345.786	405.789
Accounts Receivable	1.239	2.301	0.453	9.572	5.464
Stocks	1.735	0.339	1.076	1.101	0.964
Fixed Assets	7.542	15.699	15.534	36.980	36.285
TOTAL ASSETS	59.764	246.167	505.782	691.764	807.567

LIABILITIES					
Accounts Payable	1.679	5.450	18.102	32.815	59.331
Short-term Debt	0.000	0.637	8.408	4.163	8.240
TOTAL CURRENT LIABILITIES	1.679	6.087	26.510	36.978	67.571
	1990	1991	1992	1993	1994
Long-term Debt	38.997	184.602	364.760	458.942	454.559
TOTAL LIABILITIES	40.676	190.689	391.270	495.920	522.130

Table B-1 (continued): Historical Balance Sheet, IPED, 1990 - 1994 (Figures in current G$ millions)

EQUITY	1990	1991	1992	1993	1994
Members' Subscriptions	0.033	0.033	0.033	0.033	0.033
Capital Donations	16.648	32.355	44.319	72.972	103.662
Retained Earnings	2.409	23.092	70.161	122.838	181.745
Current-year Net Income	2.134	20.683	47.069	52.677	58.907
TOTAL EQUITY	19.090	55.480	114.513	195.843	285.440

Note: Presentation of accounts and naming convention has been modified from original IPED Balance Sheets to conform to generally accepted standards.
Source: IPED Annual Reports, 1986-1994.

Table B-2: Income and Expenditure Account, IPED 1990-1994 (Current G$ m.)

	1990			1991			1992		
INCOME	Value	% P.A.[a]	% G.I.[b]	Value	% P.A.[a]	% G.I.[b]	Value	% P.A.[a]	% G.I.[b]
Interest	4.174	20.53	47.22	14.755	10.66	46.95	33.381	11.93	44.05
Investment Income	4.477	22.02	50.64	14.514	10.49	46.19	38.924	13.91	51.36
Gain on Exchange	0.147	0.70	1.61	1.576	1.14	5.02	0.928	0.33	1.22
Other Income	0.047	0.23	0.53	0.579	0.42	1.84	2.551	0.91	3.37
TOTAL GROSS INCOME	8.84	43.47	100.00	31.424	22.71	100.00	75.784	27.08	100.00
EXPENDITURE									
Salaries and Allowances	1.088	5.35	16.22	2.552	1.84	23.76	5.548	1.98	19.32
Provision for doubtful debts	3.021	14.86	45.05	0.192	0.14	1.79	5.188	1.85	18.07
Depreciation	0.463	2.28	6.90	0.994	0.72	9.25	1.793	0.64	6.24
Rental of premises (net)	0.017	0.08	0.25	0	0.00	0.00	0.007	0.00	0.02
Printing and Stationery	0.214	1.05	3.19	0.474	0.34	4.41	0.280	0.10	0.98
Interest on PL-480 loans (1986-92)	1.112	5.47	16.58	3.254	2.35	30.30	10.912	3.90	38.00
Loss on Exchange	0	0.00	0.00	0	0.00	0.00	0.000	0.00	0.00
General and Administrative	0.791	3.89	11.80	3.275	2.37	30.49	4.987	1.78	17.37
TOTAL EXPENDITURES	6.706	32.98	100	10.741	7.76	100.00	28.715	10.26	100.00
Net income	2.134	10.49	24.14	20.683	14.95	65.82	47.069	16.82	62.11

[a] Performing Assets, equal to Gross Loan Portfolio plus Investments

[b] Gross Income

Table B-2 (continued): Income and Expenditure Account, IPED 1990-1994

	1993			1994		
INCOME	Value	% P.A.[a]	% G.I.[b]	Value	% P.A.[a]	% G.I.[b]
Interest	69.681	23.36	69.13	82.121	22.87	73.67
Investment Income	26.329	8.83	26.12	25.911	7.22	23.25
Gain on Exchange	0.000	0.00	0.00	0.024	0.01	0.02
Other Income	4.785	1.60	4.75	3.412	0.95	3.06
TOTAL GROSS INCOME	100.795	33.79	100.00	111.467	31.04	100.00
EXPENDITURE						
Salaries and Allowances	9.636	3.23	20.02	11.890	3.31	22.62
Provision for doubtful debts	5.200	1.74	10.81	1.614	0.45	3.07
Depreciation	1.967	0.66	4.09	2.875	0.80	5.47
Rental of premises (net)	0.018	0.01	0.04	0.000	0.00	0.00
Printing and Stationery	1.237	0.41	2.57	0.756	0.21	1.44
Interest on PL-480 loans (1986-92)	20.544	6.89	42.70	22.609	6.30	43.02
Loss on Exchange	0.074	0.02	0.15	0.000	0.00	0.00
General and Administrative	9.442	3.17	19.62	12.817	3.57	24.39
TOTAL EXPENDITURES	48.118	16.13	100.00	52.560	14.64	100.00
Net income	52.677	17.66	52.26	58.907	16.41	52.85

Source: Annual Reports, 1990-1994, IPED.

Table B-3: IPED Historical Balance Sheets, 1990-1994 (Figures in constant G$ m., 1990=100)

	1990		1991		1992		1993		1994	
ASSETS	Value	% change[a]	Value	% change	Value	% change	Value	% change	Value	% change
Cash and Bank	6.708	-	20.260	202.03	11.718	-42.16	4.225	-63.94	4.492	6.32
Investments	13.626	-	60.988	347.58	132.143	116.67	138.173	4.56	143.150	3.60
TOTAL LIQUID ASSETS	20.334	-	81.248	299.57	143.861	77.06	142.399	-1.02	147.642	3.68
Current Loans	19.229	-	39.215	103.94	74.224	89.27	108.588	46.30	117.030	7.77
Non-current Loans	9.685	-	13.318	37.51	33.185	149.18	56.465	70.15	49.824	-11.76
TOTAL NET LOANS RECEIVABLE	28.914	-	52.533	81.69	107.409	104.46	165.053	53.67	166.854	1.09
Accounts Receivable	1.239	-	1.351	9.05	0.233	-82.76	4.569	1861.73	2.247	-50.83
Stocks	1.735	-	0.199	-88.53	0.553	177.91	0.526	-5.00	0.396	-24.58
Fixed Assets	7.542	-	9.218	22.23	7.987	-13.36	17.652	121.01	14.920	-15.48
TOTAL ASSETS	59.764	-	144.549	141.87	260.042	79.90	330.198	26.98	332.059	0.56

[a] From previous year

Table B-3 (continued): IPED Historical Balance Sheets, 1990-1994 (Figures in constant G$ millions, 1990=100)

	1990		1991		1992		1993		1994	
LIABILITIES	Value	% change*	Value	% change	Value	% change	Value	% change	Value	% change
Accounts Payable	1.679	-	3.200	90.60	9.307	190.82	15.663	68.30	6.868	-56.15
Short-term Debt	0.000	-	0.374	-	4.323	1055.71	1.987	-54.03	0.560	-71.80
TOTAL CURRENT LIABILITIES	1.679	-	3.574	112.88	13.630	281.33	17.651	29.50	27.784	57.41
Long-term Debt	38.997	-	108.398	177.97	187.537	73.01	219.065	16.81	186.907	-14.68
TOTAL LIABILITIES	40.676	-	111.972	175.28	201.167	79.66	236.716	17.67	214.692	-9.30
EQUITY										
Members' Subscriptions	0.033	-	0.019	-41.28	0.017	-12.44	0.016	-7.16	0.014	-13.86
Capital Donations	16.648	-	18.999	14.12	22.786	19.93	34.832	52.86	42.624	22.37
Grants	0.000	-	0.000	-	0.000	-	0.000	-	0.000	-
Retained Earnings	2.409	-	13.56	463.83	36.076	166.05	58.645	62.56	74.731	27.43
Current-year Net Inc.	2.134	-	12.145	469.12	24.200	99.26	25.144	3.90	24.222	-3.67
TOTAL EQUITY	19.090	-	32.578	70.65	58.876	80.72	93.481	58.78	117.368	25.55

* from previous year

Source: Annual Reports, 1990-1994, IPED; Budget Speech, Ministry of Finance, Feb. 1995

Table B-4: Income and Expenditure Account 1990-1994, IPED. Figures in constant G$ m. (1990=100)

	1990		1991		1992		1993		1994	
INCOME	Value	% change*	Value	% change	Value	% change	Value	% change	Value	% change
Interest	4.174	-	8.664	107.57	17.162	98.09	33.261	93.80	33.767	1.50
Investment Income	4.477	-	8.523	90.36	20.012	134.81	12.568	-37.20	10.654	-17.96
Gain on Exchange	0.142	-	0.925	551.71	0.477	-48.44	0.000	-100.00	0.010	n.a.
Other Income	0.047	-	0.340	623.38	1.312	285.77	2.284	74.14	1.403	-62.81
TOTAL GROSS INCOME	8.440	-	18.453	108.74	38.963	111.15	48.112	23.48	45.833	-4.97
EXPENDITURE										
Salaries and Allowances	1.088	-	1.499	37.73	2.852	90.35	4.599	61.24	4.889	-5.92
Provision for doubtful debts	3.021	-	0.113	-96.27	2.667	2265.89	2.482	-6.95	0.664	-274.07
Depreciation	0.463	-	0.584	26.06	0.922	57.94	0.939	1.83	1.182	20.59
Rental of premises (net)	0.017	-	0.000	-100.00	0.004	0.00	0.009	138.73	0.000	100.0
Printing and Stationery	0.214	-	0.278	30.06	0.144	-48.28	0.591	310.28	0.311	-90.07
Interest on PL-480 loans (1986-92)	1.112	-	1.911	71.83	5.610	193.62	9.806	74.79	9.296	-5.49
Loss on Exchange	0.000	-	0.000		0.000	0.00	0.035	0.00	0.000	100
General and Administrative	0.791	-	1.923	143.12	2.564	33.33	4.507	75.78	5.270	14.48
TOTAL EXPENDITURES	6.706	-	6.307	-5.95	14.763	134.08	22.968	55.57	21.612	-6.28
NET INCOME	2.134	-	12.146	469.17	24.200	99.25	25.144	3.90	24.222	-3.81

* from previous year

Source: Annual Reports, 1990-1994, IPED; Budget Speech, Ministry of Finance, Feb. 1995

APPENDIX C
GUYANA MICROENTERPRISE SURVEY

Name(s): _____ M F Survey # _____

_____ M F Date Completed: _____

Address: _____ Interviewer #: _____

_____ Time In: _____ Time Out: _____

Enumeration District: _____ House# _____

GUYANA MICROENTERPRISE SURVEY

Good morning/afternoon. My name is (YOUR NAME) and I'M CONDUCTING A SURVEY ON BEHALF OF THE INTERAMERICAN DEVELOPMENT BANK TO GATHER INFORMATION ON THE ECONOMIC ACTIVITIES OF GUYANESE HOUSEHOLDS. With the information we obtain from the survey, our goal is to SUGGEST PROGRAMS AND POLICIES WHICH CAN INCREASE INCOME GENERATED BY GUYANESE HOUSEHOLDS. The questions in the survey deal with BUSINESSES OR ECONOMIC ACTIVITIES THAT TAKE PLACE IN YOUR HOUSEHOLD. BY ECONOMIC ACTIVITIES, I MEAN THOSE INCOME-EARNING ACTIVITIES RUN BY ANY MEMBER OF THE HOUSEHOLD (GIVE EXAMPLES: RETAIL STORE, WOODWORKING, CHICKEN AND SHEEP FARMING, SEWING, ETC). I do not mean wage-earning jobs where others pay you for your work (AGAIN, GIVE EXAMPLES: CLERK IN STORE OR BANK, SECRETARY, ETC).

YOUR RESPONSES TO OUR QUESTIONS WILL REMAIN CONFIDENTIAL. NO INFORMATION ABOUT YOUR INDIVIDUAL BUSINESS OR BUSINESSES WILL BE RELEASED TO ANYONE.

I. DESCRIPTIVE INFORMATION ON CURRENT BUSINESSES

A1. Do you or other household members currently operate a business or economic activity?

YES NO

1 2

(IF YES) Is the business: Rural? Urban?

1 2

(IF NO, SKIP TO QUESTION E1)

A2. How many (businesses) do you or other household members operate? Rank

NAME OR TYPE OF BUSINESS

_____	Who operates it?	M F	BOTH	1 2 3 4	
	Who owns it?	M F	BOTH		
_____	Who operates it?	M F	BOTH	1 2 3 4	
	Who owns it?	M F	BOTH		
_____	Who operates it?	M F	BOTH	1 2 3 4	
	Who owns it?	M F	BOTH		
_____	Who operates it?	M F	BOTH	1 2 3 4	
	Who owns it?	M F	BOTH		

A3. If more than one business is operated, please rank them according to sales, starting with the business which generates the most sales. (PLEASE RANK THEM 1 TO 4 USING THE SCALE ABOVE).

(FOR **THE MOST IMPORTANT** BUSINESS NOTED IN A2):
NAME/ TYPE OF BUSINESS OR ECONOMIC ACTIVITY: _____

A4. Tell me about the business (GIVE THE RESPONDENT TIME TO THINK AND ANSWER. YOU MAY USE THE FOLLOWING PROBING QUESTIONS: HOW DID THE BUSINESS GET STARTED? WHY? WHEN? WHO STARTED IT? WHAT DOES THE BUSINESS DO? WHERE DOES IT OPERATE?)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

A5. PLEASE CIRCLE NUMBER TO INDICATE ECONOMIC SECTOR OF BUSINESS:

AGRICULTURE	MANUFACTURING	RETAIL	SERVICES
1	2	3	4

A6. Did you start the business? YES 1 NO 2 Prior to this business, did you work in the same kind of business? YES 1 NO 2

(IF YES) For how many years? _____ years

A7. What year did you begin (or take over) this business? 19_____.

A8. Of those employeed by your business (INCLUDING THE RESPONDENT), how many are : Full-time workers: _____ of these, how many are family members?: _____
Part-time workers: _____ of these, how many are family members?: _____
How many of the total workers receive regular wages from the business (CIRCLE NUMBER)? 1 2 3 4 5 6 7 8 9 10 11 12

A9. How many days each week does the business operate (CIRCLE NUMBER FOR DAY)?

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1	2	3	4	5	6	7

A10. How many months each year does the business operate? (CIRCLE NUMBER(S))?

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	2	3	4	5	6	7	8	9	10	11	12

A11. I am going to read you six statements. Which of these statements most accurately describes the current status of the business (CIRCLE ONLY ONE ANSWER)?

1 My business is growing and doing well; sales are up.
2 My business is growing slowly, a little at a time.
3 My business is stable but not growing.
4 My business is declining but sales are still o.k.
5 I'm (we're) thinking of closing, selling out; sales are down.
6 I (we) have closed or cut back a lot; sales have fallen a lot.

A12. Now I am going to read some things which may affect the ability of your business to grow. Which of these statements is true **for your business now** (CIRCLE ALL THAT APPLY)?

1 I don't have the money for the business to grow (INTERNAL FINANCE)
2 I can't get a loan to expand the business (EXTERNAL FINANCE)
3 I fear getting into more debt (HIGH AVERSION TO DEBT).
4 There are not enough buyers for my (product/service) (LOW DEMAND)
5 There are too many sellers of the same product/service I make/offer (SUPPLY)
6 The materials I need to make my product are difficult to obtain.
7 Fear of neglecting family/personal life more.
8 It's hard enough supervising the employees we have.
9 Other: _____

II. BALANCE SHEET AND INCOME STATEMENT DATA

(THESE QUESTIONS **MUST** BE ANSWERED BY THE **OWNER/ OPERATOR OF THE BUSINESS**. IF HE/SHE IS NOT AT HOME, ARRANGE A TIME TO RETURN. WHEN YOU RETURN, REVIEW THE ANSWERS TO SECTION ONE AS AN INTRODUCTION TO THIS SECTION)

Now that I know about the business you (or other household member) operate(s), I would like to ask you some questions about what you actually use to (i) run the business, (ii) make (provide) your product (service) and (iii) generate your sales.

B1.	day?	week?	month?
How much cash does the business have on hand each:	G$ _____	G$ _____	G$ _____

B2. How do you know how much cash you have on hand? _____

_____

B3. Do you make credit sales or cash only? CREDIT SALES (1) CASH ONLY (2)

(IF CREDIT SALES) How much do people owe you today? G$ _____

B4. I'm going to read a list of items usually found in or used by businesses. Please indicate which of the items you use in your business and its estimated value. (PLEASE ASK THEM FOR REPLACEMENT VALUE FOR ALL ASSETS LISTED)

ASSET	REPLACEMENT VALUE (G$)	ASSET	REPLACEMENT VALUE (G$)
1 building(s)	G$ _____	8 equipment	G$ _____
2 vehicle(s)	G$ _____	9 _____	G$ _____
3 tools	G$ _____	10 _____	G$ _____
4 animals	G$ _____	11 _____	G$ _____
5 finished products in stock	G$ _____	12 _____	G$ _____
6 land	G$ _____	13 _____	G$ _____
7 raw materials	G$ _____	14 _____	G$ _____

B5. Which of the following statements best describes how you obtained the money to start up your business? (CIRCLE ALL THAT APPLY AND GIVE AMOUNT) AMOUNT

1 I (we) borrowed from family members or relatives G$ _____
2 I used my own money to start the business. G$ _____
3 I received a loan from the Bank Which bank ?_____ G$ _____
4 I borrowed from a friend or other individual in the community G$ _____
5 I borrowed from some other agency or institution? G$ _____
Which one? _____
6 Other: _____ G$ _____

B6. **Do you buy** materials for the business **on credit?** YES NO
1 2
(IF YES) How much **do you owe** other businesses **today?** G$ _____

B7.	Last week?	Last month?	In a good month?	In a bad month?
What were (are) your total sales:	G$ _____	G$ _____	G$ _____	G$ _____

B8.	Last week?	Last month?	In a good month?	In a bad month?
What were (are) your total expenses:	G$ _____	G$ _____	G$ _____	G$ _____

B9. How severe a constraint is the lack of cash in running your business?

not severe 1 | severe 2 | very severe 3

B10. Which of the following best describes how you **currently** obtain the money needed to buy materials and operate your business? (READ EACH AND CIRCLE ALL THAT APPLY)

1 I borrow from family members or relatives
2 I borrow from the Bank Which one? _____
3 I use my own money.
4 I borrow from a friend or other individual in the community (e.g. moneylender)
5 I borrow from some other agency or institution?
Which one? _____
6 Businesses give me credit for the purchases I make. (TRADE CREDIT)
7 I (we) limit family consumption (SELL ANIMALS, LIVESTOCK)
8 I participate in a Box-hand or other savings group. (ROSCAs)
9 Other: _____

III. SAVINGS AND FUTURE OF THE BUSINESS

We would like to gather information on how people save in Guyana. For our survey, savings are defined as money or possessions you set aside for future needs.

C1. Do you save? YES 1 NO 2 (YOU MAY NEED TO PROBE HERE. REMEMBER: THEY DON'T HAVE TO SAVE AT THE BANK. SAVINGS CAN ALSO BE AT HOME, IN ANIMALS)

(IF NO, SKIP TO C6)

C2. Do you save at a bank? YES 1 NO 2

If yes, please give the name of the bank: _____

	Last month?	Last year?
C3. How much did you save:	G$ _____	G$ _____

C4. How will you use your savings? (WHAT DO THEY PLAN TO DO WITH THEM)

_____

_____

_____

C5. Do you separate your business savings from your personal savings? YES 1 NO 2

(IF YES) How do you separate them?_____

_____

C6. How do you tell if the business is doing well? How do you measure success?

_____

_____

C7. According to your own definition of success, are you successful in your business?

YES 1 NO 2

C8. What changes do you foresee in your business over the next five years?

_____

_____

_____

_____

IV. DEMOGRAPHIC INFORMATION

D1. (For the owner(s)/ operator(s) of the business) What year were you born?
Owner/ operator 19_____ M F (PLEASE ENTER YEAR AND CIRCLE
Owner/ operator 19_____ M F GENDER).

(IF BUSINESS IS JOINTLY OWNED/ OPERATED, OBTAIN EDUCATIONAL DATA FOR BOTH MALE AND FEMALE OWNER/ OPERATOR. CIRCLE HIGHEST LEVEL COMPLETED.)

D2.	MALE				FEMALE			
	No School	Primary School?	Sec. school?	Univ.?	No School	Primary school?	Sec. school?	Univ?
Did you complete:	1	2	3	4	5	6	7	8

D3. How many people live in your household? _____ (WRITE TOTAL NUMBERS)
Number of adults (over age 18)? _____ Number of children? _____

D4. Do you rent your house? YES NO (IF NO, SKIP TO D5)
1 2
How much rent do you pay each month? G$ _____ (WRITE AMOUNT)

D5. Did you buy your house? YES NO (IF YES, GO TO D6; IF NO, SKIP TO D7)
1 2

D6. Do you have a mortgage? YES NO (IF YES) How was it for initially? G$ _____
1 2 How much is still owed? G$ _____

D7. What is your **average total household income per month ? (THIS IS ALL MONEY INCOME TO THE HOUSEHOLD BY ALL MEMBERS OF THE HOUSEHOLD)**

1	less than G$10,000	2	G$10,001 to G$20,000
3	G$20,001 to G$30,000	4	G$30,001 to G$40,000
5	G$40,001 to G$ 50,000	6	G$50,001 to G$60,000
7	G$60,001 to G$ 70,000	8	Over G$ 70,000

THIS IS THE END OF THE SURVEY FOR CURRENTLY OPERATING BUSINESSES. REMEMBER TO THANK THEM FOR THEIR COOPERATION.

V. TERMINATED OR FAILED BUSINESSES: Type of Business: _____

E1. Have you or another member of the household operated another business previously?
YES NO RURAL? URBAN?
1 2 (IF YES), Is the business 1 2
(IF NO, RECORD AS NON-RESPONDENT, THANK THEM, AND LEAVE)

E2. In what year did you start the business? 19____ (PLEASE ENTER DATE)

E3. When did you terminate the business? 19____ (PLEASE ENTER DATE)

E4. Did you sell the business ? YES NO (IF YES) For how much money?
1 2 G$ _____

E5. Did you go out of business? YES NO (IF YES, CONTINUE, IF NO, SKIP TO E7)
1 2

E6. Why did you go out of business? _____
_____
_____
_____

E7. Tell me a little about the business: (GIVE THEM TIME TO THINK AND ANSWER. SOME PROBING QUESTIONS: HOW DID THE BUSINESS GET STARTED? WHAT DID THE BUSINESS DO? WHO STARTED IT? WHY DID IT END?)
_____
_____
_____
_____
_____
_____
_____
_____

E8. PLEASE CIRCLE NUMBER TO INDICATE ECONOMIC SECTOR OF BUSINESS:
AGRICULTURE MANUFACTURING RETAIL SERVICES
1 2 3 4

E9. Did you start the business? YES NO Prior to this business, did you work in the
1 2 same kind of business? YES NO
1 2
(IF YES) For how many years? _____ years

E10. Of those employed by your business, how many were:
Full-time workers: _____ of those, how many were family members?: _____
Part-time workers: _____ of those, how many were family members?: _____

E11. How many of the total workers received regular wages from the business (CIRCLE NUMBER)? 1 2 3 4 5 6 7 8 9 10 11 12

E12. How many days each week did the business operate (CIRCLE NUMBER FOR DAY)?

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1	2	3	4	5	6	7

E13. How many months each year did the business operate? (CIRCLE NUMBER(S))?

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	2	3	4	5	6	7	8	9	10	11	12

VI. BALANCE SHEET AND INCOME STATEMENT DATA

Now that I know about the business you (or other household member) operated, I would like to ask you some questions about what you actually used to (i) run the business, (ii) make (provide) your product (service) and (iii) generate your sales.

F1.	day?	week?	month?
How much cash did the business have on hand each:	G$ _____	G$ _____	G$ _____

F2. How did you know how much cash you had on hand? _____

F3. Did you make credit sales or cash only? CREDIT SALES (1) CASH ONLY (2)

(IF CREDIT SALES) How much did people owe you **when the business ended**?

G$ _____

F4. I'm going to read a list of items usually found in or used by businesses. Please indicate which of the items you used in your business and its estimated value **at the time the business ended**. (PLEASE ASK THEM FOR REPLACEMENT VALUE FOR ALL ASSETS LISTED)

ASSET	REPLACEMENT VALUE (G$)	ASSET	REPLACEMENT VALUE (G$)
1 building(s)	G$ _____	8 equipment	G$ _____
2 vehicle(s)	G$ _____	9 _____	G$ _____
3 tools	G$ _____	10 _____	G$ _____
4 animals	G$ _____	11 _____	G$ _____
5 finished products in stock	G$ _____	12 _____	G$ _____
6 land	G$ _____	13 _____	G$ _____
7 raw materials	G$ _____	14 _____	G$ _____

F5. Which of the following statements best describes how you obtained the money to start up your business? (CIRCLE ALL THAT APPLY AND GIVE AMOUNT) AMOUNT

1 I (we) borrowed from family members or relatives G$ _____
2 I used my own money to start the business. G$ _____
3 We received a loan from the Bank Which bank ?_____ G$ _____
4 I (we)borrowed from a friend or other individual in the community G$ _____
5 I borrowed from some other agency or institution? G$ _____
Which one? _____
6 Other: _____ G$ _____

F6. **Did you buy** materials for the business **on credit?** YES NO
1 2

(IF YES) How much **did you owe** other businesses **when the business ended?**
G$ _____

F7.	Per week?	per month?	In a good month?	In a bad month?
What were your total sales:	G$ _____	G$ _____	G$ _____	G$ _____

F8.	Per week?	Per month?	In a good month?	In a bad month?
What were your total expenses:	G$ _____	G$ _____	G$ _____	G$ _____

F9. How severe a constraint was the lack of cash for your business?
not severe severe very severe
1 2 3

F10. Which of the following best describes how you **regularly obtained** the money needed to buy materials and operate your business? (READ EACH AND CIRCLE ALL THAT APPLY)

1 I borrowed from family members or relatives
2 I borrowed from the Bank Which one? _____
3 I used my own money.
4 I borrowed from a friend or other individual in the community (e.g. moneylender)
5 I borrowed from some other agency or institution?
Which one? _____
6 Businesses gave me credit for the purchases I make. (TRADE CREDIT)
7 I (we) limited family consumption (SELL ANIMALS, LIVESTOCK)
8 I participated in a Box-hand or other savings group. (ROSCAs)
9 Other: _____

VII. SAVINGS AND FUTURE OF THE BUSINESS

We would like to gather information on how people save in Guyana. For our survey, savings are defined as money or possessions you set aside for future needs.

G1. Do you save? YES NO (YOU MAY NEED TO PROBE HERE. REMEMBER: THEY DON'T HAVE TO SAVE AT THE BANK. SAVINGS CAN ALSO BE AT HOME, IN ANIMALS)
1 2
(IF NO, SKIP TO C6)

G2. Do you save at a bank? YES NO
1 2

If yes, please give the name of the bank: _____

	Last month?	Last year?
G3. How much did you save:	G$ _____	G$ _____

G4. How will you use your savings? (WHAT DO THEY PLAN TO DO WITH THEM)

_____

_____

_____

G5. How did you tell if the business was doing well? What were your personal indicators of success?

_____

_____

_____

_____

_____

_____

G6. According to your own definition of success, were you successful in your business?
YES NO
1 2

IV. DEMOGRAPHIC INFORMATION

H1. (For the owner(s)/ operator(s) of the business) What year were you born?
Owner/ operator 19_____ M F (PLEASE ENTER YEAR AND CIRCLE
Owner/ operator 19_____ M F GENDER).

(IF BUSINESS IS JOINTLY OWNED/ OPERATED, OBTAIN EDUCATIONAL DATA FOR BOTH MALE AND FEMALE OWNER/ OPERATOR. CIRCLE HIGHEST LEVEL COMPLETED.)

H2.	MALE				FEMALE			
	No School	Primary School?	Sec. school?	Univ.?	No School	Primary school?	Sec. school?	Univ?
Did you complete:	1	2	3	4	5	6	7	8

H3. How many people live in your household? _____ (WRITE TOTAL NUMBERS)
Number of adults (over age 18)? _____ Number of children? _____

H4. Do you rent your house? YES NO (IF NO, SKIP TO H5)
1 2
How much rent do you pay each month? G$ _____ (WRITE AMOUNT)

H5. Did you buy your house? YES NO (IF YES, GO TO H6)
1 2

H6. Do you have a mortgage? YES NO (IF YES) How was it for initially? G$ _____
1 2 How much is still owed? G$ _____

H7. What is your **average total household income per month ? (THIS IS ALL MONEY INCOME TO THE HOUSEHOLD BY ALL MEMBERS OF THE HOUSEHOLD)**

1	less than G$10,000	2	G$10,001 to G$20,000
3	G$20,001 to G$30,000	4	G$30,001 to G$40,000
5	G$40,001 to G$ 50,000	6	G$50,001 to G$60,000
7	G$60,001 to G$ 70,000	8	Over G$ 70,000

THIS IS THE END OF THE QUESTIONNAIRE FOR THE NON-SURVIVING OR FAILED BUSINESS. REMEMBER TO THANK THEM FOR THEIR COOPERATION.

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BIOGRAPHICAL SKETCH

Edward W. Bresnyan, Jr. was born on May 3, 1961 in Fort Walton Beach, Florida to Edward W. Bresnyan Sr. and Ann Bresnyan. He completed his primary and secondary education in North Dakota and Delaware, respectively. In 1983, Edward received his B.S. degree (with honors) from the University of Florida, College of Business Administration, Department of Marketing.

In 1985, Edward joined the Peace Corps and traveled to Honduras, Central America, where he lived and worked until 1989. While in Honduras, he assisted artisan development in the Santa Bárbara region and collaborated with regional development institutions--both government and private. His last year in Honduras was devoted to training and preparing new Peace Corps Volunteers for work with small businesses throughout Honduras.

Edward started his quest for the Ph.D. in September 1990. In 1992, he took a leave of absence for approximately eighteen months to supervise a series of training courses in Small Business Development in Honduras, Russia, and Mississippi. From Fall 1993 to Spring 1995 and conjoint with his doctoral obligations, Edward worked on the Global Development Initiative (GDI)--a collaborative effort between the University of Florida and the Carter Center in Atlanta, Georgia. In the final eight months with GDI, he represented the Carter Center in Guyana, South America. With the completion of this dissertation, Edward received his Ph.D. in Food and Resource Economics on December 21, 1996.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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Professor, Food and Resource Economics

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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